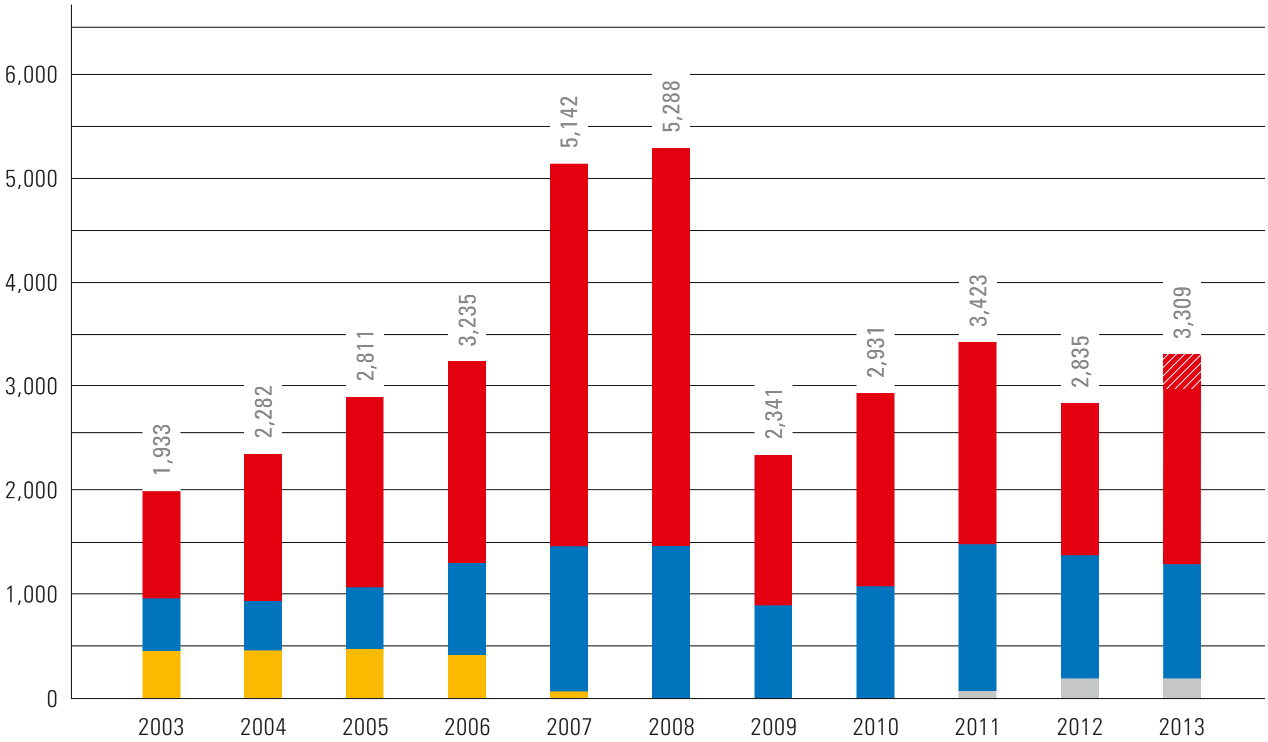
SMS group

Annual Report 2013

FIGURES
of the SMS group



Order intake by Business Areas in million EUR[1)]

SMS Siemag | Paul Wurth | SMS Meer | elexis | Plastic Technology

SMS group in million EUR[1)]	2007	2008	2009	2010	2011	2012	2013
Total order intake	5,142	5,288	2,341	2,931	3,423	2,835	3,309
of which Business Area SMS Siemag	3,725	3,870	1,479	1,892	2,007	1,519	1,708
of which Paul Wurth	–	–	–	–	–	–	336
of which Business Area SMS Meer	1,353	1,415	861	1,039	1,365	1,152	1,104
of which elexis	–	–	–	–	67	180	181
Sales	2,937	3,601	3,891	3,036	3,070	3,237	3,495
Order backlog	4,884	6,332	4,641	4,460	4,862	5,377	4,997
Employees[2)]	7,613	8,369	9,001	9,209	10,477	11,822	13,856
of which Business Area SMS Siemag	5,501	6,272	6,357	6,552	6,828	7,248	7,502
of which Paul Wurth	–	–	–	–	–	128[3)]	1,648
of which Business Area SMS Meer	1,823	2,008	2,572	2,599	3,205	3,431	3,647
of which elexis	–	–	–	–	390	967	1,005

Figures in accordance with International Financial Reporting Standards (IFRS)
1) Including Other/Consolidation
2) Year average with apprentices/other.
3) Because of the first consolidation date in December 2012, the average for Paul Wurth is only one twelfth of the overall year's average.

CONTENTS

EXECUTIVE SUMMARY

GLOBAL ECONOMY

Once again in 2013, global markets were supported by the expansive monetary policy of the large central banks. Despite this, economic growth slowed to +3.0% (2012: +3.1%). The announcement by the US Fed (U. S. Federal Reserve) that it would gradually tighten its relaxed monetary policy triggered high capital outflows from the threshold countries. The main stimulus for global growth in 2013 came from the industrialized nations, with the USA taking the lead.

Welcome news is that the eurozone turned the corner after a long period in the doldrums (3rd quarter: +0.1%, 2nd quarter: +0.3%), although no more than a moderate improvement is expected in 2014. As in previous years, the German economy achieved stronger growth, at +0.5%, than the eurozone as a whole. The engine behind this development was again strong exports combined with solid domestic demand. What is holding back a vigorous upswing in the eurozone is a high level of unemployment (12.0%) as well as persistent heavy national debt.

The dynamism of the US economy rallied strongly in 2013 (3rd quarter: +4.1%, 4th quarter: +3.2%) following a phase at the beginning of the year when tax hikes and spending cuts almost choked the economy.

China's economy grew in 2013 by +7.7%. Reaching +1.7%, growth in Japan was more rapid than anticipated. Here, a weak yen boosted exports, and the government's expansive monetary policy pushed up domestic demand.

Meanwhile, the emerging economies struggled against weak demand from the industrialized countries, inflation, and fears about the tapering off of stimulus packages. These factors held many countries back. Nevertheless, the threshold countries, with an overall rate of +4.7%, contributed over-proportionally to global growth.

THE STEEL AND ALUMINUM MARKET

Global raw steel production in 2013 totaled some EUR 1.607 billion tons, which corresponds to a growth on 2012 of +3.5%. Once again, there were significant differences between regions. As the largest steel producer, China was able to increase production by +7.5%. The Chinese government continues to focus on dismantling outdated and unprofitable plants. Production also increased in Japan and India (+3.1% and +5.1%). Conversely, raw steel production in North America and Europe in 2013 declined slightly (–2% each). Increasingly, steel producers,



Burkhard Dahmen,
Spokesman of the Managing Board of SMS Holding GmbH,
President & CEO of SMS Siemag AG



Eckhard Schulte,
Member of the Managing Board of SMS Holding GmbH,
Head of Finances and Controlling of SMS Siemag AG

above all in Europe, are under heavy price and cost pressure. This is the result of high raw-materials and energy costs, while average capacity utilization has meanwhile increased to 77%.

Global overcapacities, high raw-materials prices, and record steel production in China are keeping prices and steel manufacturers' margins low. However, in a recent poll, steel analysts said they expected the global steel market to bottom out in 2014. The positive development of global early indicators (e.g. the Institute of Supply Management's Manufacturing Index) supports these forecasts.

Totaling 50 million tons, global primary aluminum production grew compared to the previous year (+4.0%). China was again able to increase its share, reaching 49% in 2013.

MARKET SITUATION PLANT CONSTRUCTION

Just as in the previous year, the market situation for metallurgical plant and machinery construction in 2013 was difficult and characterized by a low willingness of steel producers to invest. Competition for the few major projects up for bidding was intense and caused noticeable price pressure. The expectations of good market development that emerged at the end of 2012 did not translate into reality in 2013.

Positive dynamics came mainly from Asian developing countries and above all related to plants for the production of nonferrous products. Once again in 2013, China was the largest market for metallurgical plants. Except for a few projects, market activity in Europe and South America remained subdued.

The sale of the ThyssenKrupp rolling mill complex in Alabama (USA) created clarity on the North American market. Now analysts expect that other steel producers will bring forward postponed investments on the otherwise positive American market environment.

PROSPECTS

According to experts, the main stimulants to a global upswing are likely to come from the industrialized countries. The current moderate growth and low risk of inflation allow the leading central banks to maintain their expansionary monetary policy. Overall, banks are very cautiously reining in their expansionary activities. This will divert further capital flows from the emerging economies to the industrialized countries – above all the USA.

While the upturn in the threshold countries will continue to improve, this will be at a comparatively slow rate. In the USA and Europe, the dampening effect of fiscal consolidation measures is set to ease in 2014.

Generally, in 2014, experts anticipate continued low inflation and interest rates with an economic growth of +3.7%.

There is also no change in the main markets for equipment suppliers to the metallurgical and rolling mill industry – China, India, South-East Asia, the MENA region, and the USA. The rapid expansion of production capacity for aluminum in China remains unbroken. Factors that will drive the modernization of old plants in Europe, the USA, and China are higher quality standards and steel grade requirements, often in combination with smaller batch sizes and tougher environment legislation.

FORECAST

As recently as the beginning of this year, we expected a boost to our business due to customers' hopes that the market had bottomed out. However, after the end of the first quarter of 2014, we must face the fact that global capacity utilization in the steel industry has only picked up slightly. The growth in steel demand is not sufficient to reduce market overcapacities. This in turn continues to depress the willingness of our customers to invest. Furthermore, political uncertainty in our major sales markets Russia and Ukraine as well as Venezuela is also disrupting our activities there. That's why we now expect a slight downturn in order intake in 2014 compared to the previous year.

We are responding to the declining order volume by adjusting our capacities, implementing an extensive cost-cutting program, improving processes, and continuously developing service and revamp business.

Considering the still satisfactory level of orders in hand, we can assume our sales will be similar to those of 2013. Due to one-off restructuring expenses, our operating result will once again be below that of the previous year.

REPORT ON SUBSEQUENT EVENTS

No significant events occurred after the conclusion of the business year.

INTEGRATION OF PAUL WURTH

Now, after taking over the majority share (59.1%) in Paul Wurth, the SMS group covers the entire process chain of steelmaking. The linkup with Paul Wurth was one of our key strategies last year. It creates a basis for further growth in both companies. Here we focused on the

topics “joint technological development”, “regional synergies”, and “synergies in the central functions”. Already we are seeing the benefits of our cooperation in the form of joint project processing, joint use of international locations, and tapping into new business fields. Our close cooperation and interdisciplinary process expertise provide a very strong basis for future development together.

ORDER INTAKE

The order intake by the SMS group in the last business year was EUR 3,309 million, or 17% (EUR +474 million) higher than the previous year’s figure. This is to a large part due to the first inclusion of Paul Wurth (EUR +336 million).

Business Area SMS Siemag increased its order intake by EUR 525 million to EUR 2,044 million (EUR 1,708 million without Paul Wurth) (2012: EUR 1,519 million).

Business Area SMS Meer recorded a 4% reduction in orders to EUR 1,104 million (2012: EUR 1,152 million).

Finally, the elexis group contributed EUR 181 million (2012: EUR 180 million) to the order intake of the SMS group.

This is how order intake broke down according to global regions in 2013:

- Europe including Russia: 29 % (2012: 32 %)
- Asia: 45 % (2012: 43 %)
- America: 25 % (2012: 23 %)
- Africa: 1 % (2012: 2 %)

REVENUES

Due to the first inclusion of Paul Wurth, the SMS group increased its revenues by 8 % (+EUR 484 million) to EUR 3,495 million (2012: EUR 3,237 million).

ORDER BACKLOG

The order backlog amounted to EUR 4,997 million (2012: EUR 5,377 million). In the previous year, Paul Wurth was already included in the order backlog figure with a sum of EUR 1,059 million. Examining the purchasing behavior of our customers, we have identified a specific trend. They first order only the engineering, then wait for further market developments before placing a firm order for the equipment.

EMPLOYMENT/EMPLOYEES

The average number of employees[1)] in the SMS group increased by 2,034 to 13,856 (2012: 11,822).

The number of employees in Business Area SMS Siemag increased against the previous year by 1,774, reaching an average over 2013 of 9,150 (2012: 7,376). That included 1,648 staff members of Paul Wurth (2012: 128[2)]). It was not only the first full year of inclusion of Paul Wurth which brought in more employees. There was also an increase at the Chinese company SMS Siemag Technology (Suzhou) Co., Ltd. In total, 4,408 employees were on our payroll in Germany and 4,742 abroad.

In Business Area SMS Meer, the average number of employees in 2013 was 3,647 (2012: 3,431). This increase was mainly due to the acquisition of the I.A.S. group and the first consolidation of Girard. In total, 2,233 employees were on our payroll in Germany and 1,414 abroad.

The year-average number of employees at the elexis group in 2013 was 1,005 (2012: 967).

As a result of the high level of orders in hand, almost all our departments were fully utilized in the past business year. Utilization of our engineering and manufacturing capacities is ensured in the main Business Areas into the second quarter of 2014. However, we expect under-utilization in some areas of the SMS group in 2014.

RESULT

The net result of the SMS group in business year 2013 totaled EUR 178 million, well below that of the previous year (EUR 258 million). The net operating margin was 5.1%.

The equity ratio in 2013 reached 19.3% (2012: 19%).

COST-REDUCTION ACTIVITIES

To increase our competitiveness, we implemented extensive cost-reduction measures last year along the entire value-added chain. One focus was on reducing material overheads, and that produced considerable savings in areas such as travel expenses, external services, and both building and IT costs. There was also an across-the-board drive to cut material costs. Included here were both technological and commercial steps as well as process optimizations. Furthermore, we subjected key products to a value analysis designed to reduce manufacturing costs.

We will also continue to expand our activities in the fields of electrics & automation, quality control, engineering, and shared services.

Considering the market situation, the Business Areas will again in 2014 focus on continually improving the cost structure.

[1)] Average for the year, including apprentices.
[2)] Because of the first consolidation date in December 2012, the average for Paul Wurth is only one twelfth of the overall year's average.

LIQUIDITY

Gross liquidity from securities and liquid assets decreased by EUR 173 million to EUR 1,956 million (2012: EUR 2,129 million). The inflow of funds from business operations totaling EUR 91 million coincided with an outflow of funds from our continued high investment of EUR 155 million and from financing activities to the amount of EUR 54 million. The outflow of funds from financing activities results from a higher dividend than in the previous year. Furthermore, exchange-rate fluctuations and consolidation changes reduced holdings of securities and liquid assets by EUR 55 million. All this results in a net liquidity after deduction of financial obligations of EUR 1,760 million (2012: EUR 1,980 million).

The SMS group is essentially self-financing. External financing from banks is negligible.

INVESTMENTS

Investments in property, plant, equipment and intangible assets in business year 2013 came to EUR 142 million (2012: EUR 124 million). Investments mainly went into expanding and modernizing our workshops in Germany, China, and India, as well as into extending our international network of service workshops. We also invested in upgrading our IT systems and buying the Schlafhorst Businesspark in Mönchengladbach.

A sum of EUR 87 million is earmarked for investment in intangible and tangible assets over the current year. The focus here will be on setting up more service workshops and rolling out the SAP system. Investment in IT and machine replacements remains at the usual level.

Financial investment in business year 2013 totaled EUR 52 million (2012: EUR 419 million, mainly due to the takeover of the majority share in Paul Wurth S.A., Luxembourg). A major financial investment was the acquisition of the company I.A.S., based in Iserlohn, Germany.

Burkhard Dahmen

Eckhard Schulte

STRUCTURE OF THE **SMS GROUP**

The SMS group is, under the roof of SMS Holding GmbH, a group of global players in plant construction and mechanical engineering for the steel and nonferrous metals processing industry. It consists of the two Business Areas SMS Siemag and SMS Meer, as well as industrial participations. As the financial organization, SMS Holding GmbH is responsible for strategic planning and controlling. The sole owner of the SMS group is Siemag Weiss GmbH & Co. KG, the holding of the Weiss entrepreneurial family.

PAUL WURTH
SMS group

COKE OVEN AND SINTERING PLANTS

- Coke oven plants
- Coke oven batteries
- Coke oven auxiliary plants
- Coke oven automation and control
- Coke handling machines
- Sintering plants
- Sinter cooling
- Sinter off-gas cleaning (EFA™)
- Environmental protection technologies for the metals industry
- Steelmaking by-product recycling plants

BLAST FURNACE PLANTS

- Complete blast furnace construction and modernization
- Stockhouse and charging systems
- Blast furnace top charging systems
- Blast furnace proper design
- Blast furnace lining and cooling
- Hot blast stoves and energy recovery
- Blast furnace gas cleaning systems
- Furnace automation and control systems
- Coal grinding, drying, and pulverized coal injection plants
- Tapping and measuring technology
- Slag granulation
- Pig casting machines

SMS group

SMS SIEMAG

SMS group

METALLURGICAL PLANTS AND ENVIRONMENTAL TECHNOLOGY

METALLURGICAL AND STEELMAKING TECHNOLOGY

- Reduction metallurgy
- Converters
- Electric steelworks
- CONARC® furnaces
- Pretreatment
- Secondary metallurgy
- Tertiary metallurgy
- Filter and environment protection plants
- Dedusting plants

CONTINUOUS CASTERS

- Continuous casting technology for slabs
- CSP® technology
- Filter and environment protection plants

FLAT PRODUCT PLANTS

HOT ROLLING MILLS

- Hot rolling mills
- Steckel rolling mills
- Heavy plate mills
- CSP® technology
- Filter and environment protection plants
- Water supply systems
- Logistics systems

COLD ROLLING MILLS

- Tandem cold rolling mills
- Reversing rolling mills
- Skin-pass mills
- Multi-roll mills
- Filter and environment protection plants
- Logistics systems

ALUMINUM PLANTS

- Hot strip rolling mills
- Tandem cold rolling mills
- Individual stands
- Thin strip stands
- Annealing lines
- Coating lines
- Anodizing lines
- Shear and slitting equipment
- Filter and environment protection plants
- Logistics systems

PROCESSING LINES AND FURNACE TECHNOLOGY

STRIP PROCESSING LINES

- Pickling lines
- Hot-dip galvanizing lines
- Annealing lines
- Coating lines
- Annealing and pickling lines for stainless steel
- Shear and slitting equipment
- Regeneration, filter, and environment protection plants

FURNACE TECHNOLOGY

- Furnaces and cooling systems for heat treatment of flat steel and NF metals

ELECTRICS AND AUTOMATION

SERVICE

SMS MEER

SMS group

elexis

STEELMAKING/ CONTINUOUS CASTING

- Minimills
- Steelmaking
- Electric arc furnaces (AC/DC)
- Ladle furnaces
- VD/VOD plants
- Dust collecting systems
- Continuous casters
  - Billets
  - Blooms
  - Beam blanks
  - Round products

TUBE & PIPE PLANTS

- Seamless tube plants
  - PQF® plants
  - CPE plants
  - Plug mills
  - Hot pilger mills
  - Assel mills
- Welded tube plants
  - ERW plants
  - Large-diameter pipe plants
  - Spiral pipe welding plants
- Finishing lines
- Cold pilger mills
- CARTA® Technology System
- LASUS® hot tube wall thickness measurement

LONG PRODUCTS PLANTS

- Hot rolling mills
  - Beams
  - Rails
  - Sheet piles
  - Sections
  - Light sections
  - Wire rod
  - Merchant bars
- Straightening machines
- Peeling machines
- Drawing machines
- Grinding and polishing machines

FORGING PLANTS

- Open-die forging presses
- Closed-die forging presses
- Powder presses
- Radial forging machines
- Wheel rolling machines
- Forging rolls
- Ring rolling machines
- Forging manipulators
- Extrusion presses
- Special presses

(STEELMAKING/CONTINUOUS CASTING, TUBE & PIPE PLANTS, LONG PRODUCTS PLANTS and FORGING PLANTS: INTEGRATED PLANTS)

NF METALS PLANTS

Aluminum plants

- Smelting and casting furnaces
- Casters
  - Vertical
  - Horizontal
- Continuous homogenization plants
- Chamber homogenization plants
- Ingot scalpers
- Band saws
- Brazing machines
- Plate stretchers

Copper plants

- Anode casting wheels
- CONTIROD® plants
- directube® plants
- VERTICAST® plants
- Straighteners
- Drawing plants
- Inner grooving lines

HEAT TREATMENT TECHNOLOGY

Induction technology/ Tempering plants

- Hardening machines
- Inductive heating plants
- Laser exposure systems
- Inductive tube welding
- Inductive seam annealing
- Quench and temper lines
  - Bars and tubes
  - Conventional and inductive

Heating furnaces

- Conventional heating furnaces
  - Heating furnaces
  - Reheating furnaces
  - Holding furnaces
  - Rotary hearth furnaces

AUTOMATION TECHNOLOGY

- Strip and web-guiding systems
- Quality assurance systems
- Drive technology
- Automated handling systems plastic

ELECTRICS AND AUTOMATION

SERVICE

SMS SIEMAG



Dieter Rosenthal,
Sales and Technology

GRASPING POSSIBLE OPPORTUNITIES IN THE CRISIS

Last year at this point we reported on the overcapacities in global steel production and the heavy cost pressure our customers face. The significant upswing we originally anticipated for business year 2013 failed to materialize.

The consequences for us are: continued low willingness of our customers to investment in new plants and machinery.

OPPORTUNITIES IN SPECIAL METALLURGY, GREEN TECHNOLOGY, MODERNIZATION

There are exceptions, such as the sustained boom in special metallurgy that is generating business with electric arc and smelting furnaces, and further increases in the demand for our Ecoplants solutions. Ecoplants attracted favorable attention when we presented them at the Green Innovative Product & Technologies Show late last year in Guangzhou, southern China. Furthermore, our modernization solutions offer economic advantages throughout the process chain, even for customers with smaller investment budgets.

Against this background, order intake in business year 2013 by Business Area SMS Siemag, for the first time including Paul Wurth, was EUR 2,044 million (2012 without P. Wurth: EUR 1,519 million), which fell short of our expectations. Sales increased to EUR 2,168 million (2012 without P. Wurth: EUR 1,889 million).

INCORPORATION OF PAUL WURTH CREATES SYNERGIES

The successful incorporation of Paul Wurth into Business Area SMS Siemag involved the identification of common technological and sales synergies.



Dr-Ing. Guido Kleinschmidt,
Sales and Technology



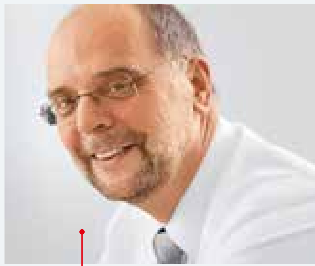
Harald Rackel,
Order Handling and
Quality Management



Burkhard Dahmen,
President & CEO



Marc Solvi,
Paul Wurth



Eckhard Schulte,
Commercial

This addition to the SMS group helps complete our range as a supplier of equipment for the entire process chain in metallurgical plant and machinery construction. One example of this is the license contract concluded in March this year with Kobe Steel Ltd. (Japan) for construction of a Midrex direct reduction plant (DRI).

We work systematically on innovation processes so that we can offer our customers attractive products and solutions at competitive prices. Successful over many decades, we have built up a reputation as a tradition-rich company that stands for quality and reliability. Crucially, our customers must appreciate that what they get from us are cost-effective overall systems and state-of-the-art technology.

SECURING QUALITY – CUTTING COSTS

To ensure high quality, we remain committed to producing the most complex components of our machinery and plants in Germany. That’s why we have invested heavily in revamping our production shop in Hilchenbach in the past six years.

Simultaneously, we have also increased our workshop capacities in China. The focus here is on the provision of better customer services locally and the construction of machines specifically designed for the Chinese market. It is a similar picture on the Indian market, where another workshop is currently under construction and scheduled to start operations in 2014.

Overall, we are working on cutting manufacturing costs even more with production-optimized design plus greater efficiency in engineering, manufacturing, and logistics. Furthermore, we are continuing to expand our presence on our customer markets in India, South America, the Middle East, and China.

COKE OVEN PLANTS, SINTERING PLANTS, BLAST FURNACES



- Expansion of modernization and maintenance services
- Coke oven technology gains in importance
- Environment prize for energy-saving, green solution
- Energy Task Force for devising efficient methods covering the entire steelmaking process chain

2013



Once again in 2013, steel producers operated in a difficult market situation characterized by global overcapacities, tough price competition, and continued relatively high raw-materials costs. Correspondingly, the business environment for plant constructors was also very challenging. As our customers shelved many of their planned investment projects, order intake by the Paul Wurth group declined strongly in 2013 compared to the previous year. However, due to the high level of orders in hand at the beginning of the year, as well as efficient order processing, the group was able to sustain sales volume.

It is unlikely that additional production plants will be built in the near future, so customers – and with them Paul Wurth – will focus on modernization and maintenance services. That's why service business was systematically expanded in 2013. Our objective here is to be perceived as a supplier of solutions covering the entire furnace campaign. Particularly worth mentioning in this context is the first contract for preventive maintenance on blast furnaces 1 and 2 at ThyssenKrupp CSA in Brazil. This project was a complete service package and is a groundbreaking reference.

BLAST FURNACES

The core competence of Paul Wurth is complete blast furnace construction. Since commissioning its first new blast furnace in 1954, the group has amassed more than 220 references relating to new construction or revamp projects where it played a major role in development and implementation. Included here were planning, design/engineering, technology and core equipment, site management, and supply of turnkey plants.

The list of references grew in the past business year by several commissioning projects. One highlight was in September 2013 at Hyundai Steel in South Korea, when the last of a total of three blast furnaces, for which Paul Wurth supplied the plant engineering and the key components, went into production. Another two blast furnaces were commissioned in India. They were the new blast furnace 2 at Bhushan Steel and the revamped blast furnace G at Tata Steel.

Not only successful in complete plant construction, Paul Wurth continues to be in demand as a partner for high-quality and reliable processes such as coal grinding, drying, and injection technology, blast furnace charging technology, recuperators, and INBA® slag granulating systems.

COKE OVEN TECHNOLOGY AND SINTERING PLANTS

Once again in 2013, the Coke Oven Technology Division increased in importance. With the commissioning of two new coke oven batteries complete with gas treatment plants at PT Krakatau Posco in Indonesia, Paul Wurth was for the first time able to add the new construction of large batteries to its list of references. Further preliminary contracts for the design of a new coke oven battery in Japan and a coke dry quenching plant in India prove that currently the markets in both Europe and Asia offer opportunities for the construction or revamp of coking plants. This is because of the outdated equipment and stricter environment legislation in these regions.

ENERGY-SAVING, GREEN SOLUTIONS

Employees of SMS Siemag and Paul Wurth have set up an Energy Task Force that is working on efficient solutions for saving energy along the entire steelmaking process chain

Today, R&E efforts at the Paul Wurth group focus more than ever on green solutions.

The Luxembourg National Industries Federation FEDIL awarded its annual environment prize to Paul Wurth for its project "Dry granulation of blast furnace slag with energy recovery". This was high-prestige recognition of the company's success in this field.

The innovative process has been applied since November 2013 in an industrial pilot plant at Dillinger Hütte. What makes it so special is that the technology requires no water for granulation of the blast furnace slag, and it recovers the energy in the liquid slag while also reducing CO_2 and phosphor emissions.

OTHER DIVISIONS

In 2013, Paul Wurth S.A. acquired the remaining 24.8% of CTI Systems S.A., which will from now on operate as a full subsidiary of the Paul Wurth group. Straight away, CTI successfully extended the group's product range with its telescopic platforms, cranes, and docking systems for big names in the aviation industry such as Airbus or Bombardier, as well as for trailer manufacturers.

MAJOR ORDERS

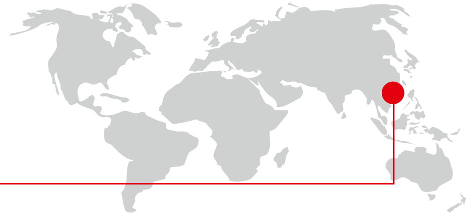
TECHNOLOGY FOR HOT METAL PRODUCTION

- Salzgitter Flachstahl, Germany; engineering, supply, and assembly of two turnkey coal grinding, drying, and injection plants complete with material treatment for blast furnaces A and B
- Ilva, Italy; engineering, supply of key components, and assembly for the revamp/reline of blast furnace 1 in the works in Taranto
- ArcelorMittal Ostrava, Czech Republic; revamp of the recuperator of blast furnace 2
- China Steel, Taiwan; reline of the recuperator of blast furnace 1
- ThyssenKrupp Steel Europe, Germany; reline of the slag granulation plant of blast furnace 2
- Jindal South West, India; engineering and supply of key components for the modernization of blast furnace 1 in the Vijaynagar works
- ArcelorMittal Méditerranée, France; engineering, supply of key components, and assembly of a coke oven gas desulfurization plant in Fos-sur-Mer

COMMISSIONING PROJECTS

TECHNOLOGY FOR HOT METAL PRODUCTION

- Hyundai Steel, South Korea; new blast furnace 3 at the Dangjin location
- Bhushan Steel, India; new blast furnace 1 in the Meramandali works
- Tata Steel, India; modernization of blast furnace G in the Jamshedpur works
- PT Krakatau Posco, Indonesia; new coke oven batteries 1 and 2 and gas treatment plant in the Cilegon works
- Novolipetsk Iron and Steel, Russia; coal grinding, drying, and injection plant for blast furnace 5
- JSC Evraz Nizhniy Tagil Metallurgical Plant, Russia; coal grinding, drying, and injection plant for blast furnaces 5 and 6
- Trinecke Zelezarny, Czech Republic; coal grinding, drying, and injection plant for blast furnaces 4 and 6
- Dragon Steel, Taiwan; two INBA slag granulation plants for blast furnace 2 in the Taichung works
- China Steel, Taiwan; INBA slag granulation plant for blast furnace 4 in the Kaohsiung works



Location: South Korea

HYUNDAI STEEL STARTS UP BLAST FURNACE 3

Just three years after commissioning blast furnaces 1 and 2, South Korean steel producer Hyundai Steel (HSC), on September 13, 2013, started up blast furnace 3. That largely wrapped up its ambitious construction of a new, integrated steelworks at the Dangjin location.

A member of the Hyundai Motor Group, Hyundai Steel in 2006 and 2007 decided to invest in a new integrated steelmaking plant with three large blast furnaces as an extension to the existing electrical steel line. Its aim was to manufacture high-quality products especially for automotive applications. Together, Hyundai's existing electric furnaces and the new steelworks can produce up to 24 million t of steel per year.

It was in April 2007 that the Paul Wurth group received the order for the plant engineering and supply of key components for blast furnaces 1 and 2. Shortly after the successful and on-time commissioning of these furnaces in 2010, Paul Wurth was awarded a contract in March 2011 for a similar supply scope for the third blast furnace. All the plant components feature modern blast furnace technology designed to achieve the best possible process parameters. That goes for resource and energy efficiency, eco-friendliness, and compliance with health and safety standards.



Paul Wurth supplied the engineering and key components for blast furnaces 1, 2, and 3 of Hyundai Steel, South Korea.

[1] | Marc Solvi, CEO of Paul Wurth, makes a speech during the commissioning ceremony for blast furnace 3.
[2] | The commissioning ceremony for blast furnace 3 took place on September 13, 2013.





METALLURGICAL PLANT AND STEELMAKING TECHNOLOGY



- Leading market position with submerged-arc and smelting furnaces (SAF)
- Successful launch of tertiary metallurgy
- Turnkey business expanded
- Expertise in green technology and energy saving in demand

2013



The market situation for steelmaking plants remained extremely constrained in 2013. However, under difficult conditions, SMS Siemag was able to retain its market position

The Metallurgical Technology Division was able to almost double its order intake compared to the previous year. The reason was the implementation of major projects SMS Siemag attracted in 2012 as well as the success achieved in submerged-arc furnace projects. Sales remain at the same level as in the previous year.

Worldwide we occupy a leading position on the market for submerged-arc and smelting furnaces. For instance, our South African subsidiary SMS Metix attracted a major order from the South African producer of ferroalloys Sakura at its location in Malaysia.

Also new on our books was an order from a Korean customer for the world's largest SAF for ferronickel production. In Indonesia, SMS Siemag is supplying the complete equipment for the modernization of a ferronickel SAF. There was also an order from the USA for an SAF designed to produce metallic silicon.

As part of a major contract for SMS Siemag to supply a new steelmaking complex, a South American customer ordered an electric steelmaking plant.

We also attracted contracts on the Indian market for expanding existing converter steelmaking plants as well as engineering contracts as preliminary stages to the supply of new production units.

Further successes on the European market included the conclusion of contracts with a Slovenian special steel producer for secondary metallurgy plants. In the Netherlands, we are revamping a BOF converter. Extra special here is that the new tilting drive for the converter will be the largest ever to be manufactured in our workshop in Hilchenbach (Germany).

Another big success was the launch of our new tertiary metallurgy product in the form of an order for a VIM plant from Tata Stocksbridge. This plant will be used to produce high-end materials specifically for the aviation and aerospace industry. Commissioning is scheduled for the first half of 2015.

Especially active in the field of green technology, SMS ELEX is supplying the equipment for the modernization of the electrostatic filter systems of a German steelworks operator.

The key markets for our metallurgical technology are Russia, India, South-East Asia, and North America.

Increasingly, the Chinese market is shifting its focus to green technology projects. Here again we are well positioned with our energy recovery products and clean air innovations.

TURNKEY SYSTEMS FOR MAJOR PROJECTS

There is an unbroken strong global demand for nonferrous metals processing products. What our customers want above all are plants for producing special ferroalloys and for residual substance recycling. These projects are typically high volume, partly due to the increasing share of auxiliary plants. That's where our status as a system supplier gives us a successful edge on the market.

More and more customers require turnkey solutions. A current example is the order from Sakura for a plant to produce the alloys ferromanganese and silicon manganese at its location in Malaysia. SMS Siemag is acting as the general contractor for the project and will be able to strengthen its market position with its turnkey expertise.

Following an order from PTKP Posco, SMS Elex is supplying extensive waste gas purification technology to an integrated metallurgical plant for the first time. Included here is the primary gas cleaning with a gas conditioning tower, plus an electro-static precipitator

EXPERTISE IN ECO-TECHNOLOGY AND ENERGY OPTIMIZATION

Working in cooperation with ArcelorMittal Gent (Belgium), we developed a pilot PEM (primary energy melter) with an annual capacity of 220,000 tons. The PEM shaft furnace melts scrap using primary energy. That saves money and is eco-friendly because it eliminates the conversion and electricity losses involved in coal power.

NF METALS IN THE CONVERTER

Right now, the Division is planning new, improved melting processes for the production of nonferrous metals and ferroalloys. This is in response to increasing demand. Here we are cooperating with industrial partners to develop innovative processes and technologies.

MODERNIZATION EXPERTS

Our customers continue to invest in quality improvement. Currently, we are expecting orders for modernizations and extensive expansions of existing process lines.

Crucial to attracting orders for revamps of converter steelmaking plants is the unique expertise SMS Siemag applies. This world-leading know-how helped us successfully commission three revamped converter plants in Belgium and Germany in 2013. Furthermore, up to five commissioning projects are scheduled for 2014 in Germany, the Netherlands, and Turkey.

MAJOR ORDERS

SPECIAL METALLURGY/SUBMERGED-ARC FURNACES

- POSCO SNNC, Korea; the world's largest ferronickel SAF
- PT Antam, Indonesia; complete equipment for a Fe-Ni-SAF
- Sakura, Malaysia; turnkey supply of two SAF with balance of plant
- Mississippi Silicon, USA; silicon metal SAF

STEELMAKING PLANTS

- Siderúrgica Nacional, Venezuela; complete steelworks with heavy plate rolling mill
- Vizag Steel, India; expansion of the steelworks by a third converter at Visakhapatnam location
- JSPL Angul, India; engineering for a complete converter steelworks
- Tata Steel Ijmuiden B.V., Netherlands; modernization of a converter

SECONDARY METALLURGY

- Tata Steel, England; 18/8-t VIM X-eed plant
- Metal Ravne, Slovenia; secondary metallurgy center (LF and VD/VOD)
- Fuxin, China; 150-t Duplex VOD plant
- Hyundai, South Korea; 155-t RH plant

COMMISSIONING PROJECTS

SPECIAL METALLURGY/SUBMERGED-ARC FURNACES

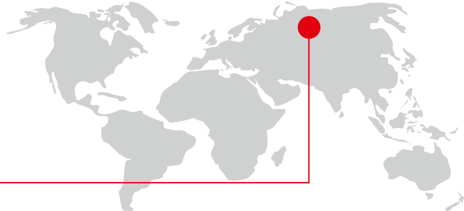
- Guodian, China; two calcium carbide furnaces
- Posco, South Korea; FeSi submerged-arc furnace No. 1
- Junzheng, China; four calcium carbide furnaces

STEELMAKING PLANTS

- Neelachal, India; 110-t converter steelworks
- Bhushan Steel, India; two 180-t converter steelworks
- JSPL Angul, India; 250-t electric arc furnace
- Fuxin Special Steel, Taiwan; steelworks for stainless steel slabs
- TMK, Russia; electric steelworks
- ArcelorMittal Gent, Belgium; converter modernization
- ThyssenKrupp Steel Europe, Germany; 400-t converter in Duisburg-Bruckhausen plant
- Salzgitter Flachstahl, Germany; converter modernization

SECONDARY METALLURGY

- Dillinger Hütte, Germany; 190-t VOD plant
- Tubos Reunidos, Spain; 110-t RH plant
- Siderar, Argentina; 200-t RH-TOP plant



OAO TAGMET

Location: Russia

SUCCESSFUL COMMISSIONING OF AN ELECTRIC STEELMAKING PLANT AT TMK

SMS Siemag commissioned an electric steelmaking plant in the "Taganroger Metallurgical Works" (OAO TAGMET) belonging to the TMK group in Russia. The first heat in the ARCCESS® electric arc furnace was successfully performed on June 28, 2013. The plant at the Taganrog location is designed for an annual production of one million tons of steel.

It replaces a Siemens-Martin steelmaking plant and meets the required high environmental standards with advanced gas cleaning technology and the re-introduction of filter dusts into the melting process.

As part of this project, SMS Siemag supplied an ARCCESS® electric arc furnace with a tapping weight of 135 tons, the scrapyard equipment, dust collecting and gas cleaning systems, and the additive supply system. Furthermore, SMS Siemag equipped the plant with a combined injection system which can inject lime, filter dust, and carbon.

The entire X-Pact® electrical and automation systems also came from SMS Siemag. Included here are process automation (level 1) and the technological process model for the furnace process (level 2), as well as commissioning according to the tried-and-tested Plug & Work concept.



Successful cooperation – the Tagmet and SMS Siemag teams.

OAO TAGMET is a company of the Russian TMK group, one of Russia's largest manufacturers of pipe steel grades for the oil, gas, and civil engineering industries. The group's main production sites are in Taganrog, Seversky, Volzhsky, and Sinara.

ARCCESS® electric arc furnace with a tapping weight of 135 tons.





CONTINUOUS CASTERS
FOR FLAT PRODUCTS



- Improved strategies for energy-efficient continuous casters
- Expansion of the product range with new processing line for steel slabs
- STEC-Roll® successfully installed at three more customer plants
- Individual assembly strategy for fast replacement of the ladle turret at Salzgitter Flachstahl (Germany)

2013



Furthermore, the Division has added a complete line for conditioning steel slabs to its range

Order intake in 2013 was lower than in the previous year, whereas sales matched the 2012 level. Due to the market for conventional slab plants failing to pick up, we were not able to achieve the planned order volume. Flat steel production stagnated globally, apart from in China, and the willingness of customers to invest was low, especially in the industrialized countries.

What's more, we anticipate sluggish demand for new plants in the current year. However, we see an increase in market volume for thin slab plants. There is also good reason to expect an upturn in orders for CSP® continuous casters – partly because of the expansion of the format range – above all in India, Asia, and the CIS countries. When it comes to new plants, operators are choosing flexibility and lowest production costs.

Orders in the area of thin slab plants are likely to concentrate on revamps and general overhauls. Today, customers demand that plant suppliers achieve very short alteration times in addition to taking care of management and coordination of the project. We are responding to this development by expanding our modernization concepts.

Indian company Jindal South West contracted SMS Siemag to supply an automatic slab conditioning line. Unique in the world, this plant covers the entire continuous process of two-sided slab scarfing, 3D surface inspection, and grinding.

CUSTOMIZED INSTALLATION PLAN AT SALZGITTER FLACHSTAHL RESULTS IN RAPID REPLACEMENT OF LADLE TURRET OF CONTINUOUS CASTER NO. 2

Working at Salzgitter Flachstahl GmbH (SZFG) (Germany), SMS Siemag supplied and successfully commissioned a new ladle turret for continuous caster No. 2. Previously, SMS Siemag developed a tailor-made installation plan which did not interfere with ongoing production by the neighboring plants during the revamp. Due to the limited space available as well as logistical conditions, it was necessary to completely pre-assemble the turret at mill floor level. Despite a total weight of 340 tons, the ladle turret was inserted in one piece. That was how the assembly method developed by SMS Siemag resulted in a successful and speedy modernization.

ARCELORMITTAL EISENHÜTTENSTADT IMPROVES CASTING PROCESS WITH STEC-ROLL®

ArcelorMittal Eisenhüttenstadt awarded us a contract to supply 44 STEC-Roll® lines. The rolls will be installed during modernization of the first strand of the two-strand slab caster.

STEC-Roll® technology replaces systems currently on the market and ensures long service lives as well as simpler assembly and dismantling.

The rolls will be installed in four segments of the straightening zone, where long service lives are immensely important. Our STEC-Roll® lines optimize the casting process and set new standards in efficient maintenance.

ArcelorMittal Eisenhüttenstadt has already had very good experience with STEC-Roll®. There is ample proof of the rolls' efficiency from an endurance test over 24 months.

ArcelorMittal Eisenhüttenstadt is an integrated steel plant situated in East Brandenburg (Germany). It manufactures products for the automotive, household-appliances, and construction industries. A major sales area is high-quality sheet metal plates for the automotive industry.

SUCCESSFUL COMMISSIONING OF HYDRAULIC OSCILLATION SYSTEM IN THE CSP® PLANT OF GALLATIN STEEL (USA)

A hydraulic oscillation system from SMS Siemag was successfully commissioned in the CSP® plant of Gallatin Steel, Warsaw, Kentucky (USA) in October 2013. It completely replaced the old electromechanical system.

SMS Siemag was responsible for the design and supply of the entire mechanical and hydraulic systems as well as the X-Pact® automation systems. The objectives of the modernization are to improve product quality and flexibility and reduce repair and maintenance costs.

Originally, the CSP® plant at Gallatin Steel was erected by SMS Siemag in 1995

ENERGY-EFFICIENT CONTINUOUS CASTERS

Wherever possible, we are dedicated to reducing energy consumption or utilizing waste energy in a profitable way. Ultimately, that not only saves resources, but also helps our customers permanently cut their energy costs.

The energy recovery plant developed by SMS Siemag works on the principle of a heat exchanger. It uses the radiation energy from the slabs to generate saturated steam. This saturated steam can then go into the plant operator's energy network or be converted into electricity.

Our "EcoMode" plant assistant system runs the continuous caster in energy-saving mode. That's because "EcoMode" automatically switches off or powers down electricity consumers to a minimum during casting breaks.

Closely cooperating with a partner, SMS Siemag has improved the injection nozzle technology. This optimized two-substance nozzle, the X-Cast® Eco-Cooler, achieves a cooling intensity that is approx. 15% higher without using more water. Moreover, it can reduce air consumption by at least one fifth compared to conventional two-substance nozzles.

X-CAST® LASR – MARKET SUCCESS WITH SMS SIEMAG SOFTWARE

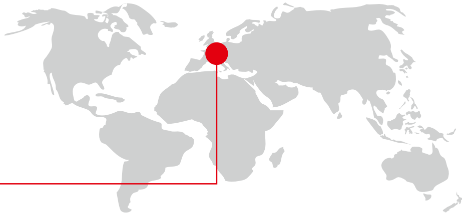
Using the X-Cast® LASr with 3D laser measuring system we developed for measuring segments, molds, and strand position, operators can perform all measuring tasks at high quality and reliability after just a short learning period. This is possible thanks to its intuitive control system. Using X-Cast® LASr together with support stands eliminates the need for a normal alignment stand in the workshop. The major advantages are the flexibility and reproducibility of the measured data.

MAJOR ORDERS

- Siderúrgica Nacional, Venezuela; steelmaking plant and continuous caster
- Hebei Pujang, China; medium-slab continuous caster – complete supply from China
- Jindal South West, India; automatic slab conditioning plant
- ArcelorMittal Eisenhüttenstadt, Germany; STEC-Roll® lines
- SSAB Iowa, USA; STEC-Roll® lines
- SSAB Mobile, USA; STEC-Roll® lines

COMMISSIONING PROJECTS

- Gallatin Steel, USA; hydraulic oscillation system in the CSP® plant
- Fuxin Special Steel Co. Ltd., Taiwan; continuous caster for stainless steel slabs
- Salzgitter Flachstahl, Germany; replacement of ladle turret of continuous caster 2
- Rourkela Steel Plant, India; slab continuous caster
- Nucor Steel Berkeley, USA; modernization of the CSP® plant



SALZGITTER FLACHSTAHL GMBH

Location: Germany

BCT® – BELT CASTING TECHNOLOGY

The belt casting line (Belt Casting Technology – BCT®) of Salzgitter Flachstahl GmbH at its location in Peine (Germany), went into production around one year ago. What makes the BCT® process different is that liquid steel flows over the distribution channel into a vessel which then transfers the steel onto a cooled transport belt. There it solidifies horizontally without bending and without the addition of casting powder under an inert atmosphere to form a thin strip 15 millimeters thick.

After successful commissioning of the belt caster, the process stability and efficiency of the plant for structural steels were proven in 2013. Now, every 70 tons of input material produces 500 meters of strip. The casting technology is essential for the production of modern, highest-alloy grades.

Currently the market is undergoing a transition toward high-strength, high-ductility ferro-manganese steels. There have already been initial casts of these ultimate-performance materials. The aim in 2014 is to improve the product quality and to commence production of HSD® (high strength and ductility) steel.

Everything points to success, because the results after rolling the first 15-millimeter strip from carbon steel are very promising.



Exit area of the reversing stand.

The SZFG strip caster in Peine produces more than 500 meters of strip per cast.





HOT ROLLING MILLS



- New: Cold plate leveler for special materials
- Better process understanding, better products
- Hot strip mill for Baosteel Zhanjiang
- Second heavy plate mill in operation at Hyundai Steel
- VDM Metals Siegen: fast modernization
- Wuhan Iron and Steel: coiler modernization

2013



SMS Siemag received its first order for a new cold plate leveler from VDM Metals GmbH for its Altena location in Germany

Demand for conventional hot rolling mills and heavy plate mills in 2013 was subdued. However, interest in CSP® thin slab technology increased. SMS Siemag noted a high demand for complex revamps.

No significant market recovery is expected for the Division in 2014. Energy-efficient solutions will gain in importance, as will turnkey projects.

BETTER PROCESS UNDERSTANDING, BETTER PRODUCTS

Adding a microstructure model for heavy plate production to its metallurgical process models, SMS Siemag has further improved product quality. This development cuts sampling and analysis work. The model makes it possible in offline mode to calculate plate rollings and simulate new products under different framework conditions.

NEW: COLD PLATE LEVELER FOR SPECIAL MATERIALS

Especially for leveling high-performance materials, we developed an 11-roll cold plate leveler that can be operated optionally with 5, 7, or 11 rolls. This method enables customers to level a very wide product range with yield strengths of 85 to 950 MPa.

HOT STRIP MILL FOR BAOSTEEL ZHANJIANG

Baosteel Zhanjiang Iron & Steel Co. Ltd. (China) awarded SMS Siemag an order to supply a new 2,250 millimeters hot strip mill. The plant is designed for an annual capacity of 5.5 million tons of hot strip with final gages of 1.2 millimeters to 25.4 millimeters and strip widths of 800 millimeters to 2,100 millimeters.

Sophisticated and capable of high performance, the hot strip mill consists of a slab sizing press, one two-high and one four-high reversing roughing stand, each with an edging stand, seven CVC® plus four-high finishing stands, the laminar strip cooling, and two hydraulic coilers.

Thanks to its numerous technology packages and Ecoplants components, the hot strip mill will set a new standard in efficient and eco-friendly hot strip production.

This will be the first new plant in the world equipped with Sieflex® HT (high torque) spindles. These spindles can reliably transfer much higher drive torques than previously possible.

SECOND HEAVY PLATE MILL IN OPERATION AT HYUNDAI STEEL

In June 2013, Hyundai Steel successfully commissioned a 4.3-meter heavy plate mill supplied by SMS Siemag. Added to the five-meter heavy plate mill in production there since 2009, the new plant means Hyundai Steel now runs two heavy plate mills from us at its Dangjin location in South Korea.

The 4.3-meter rolling mill is designed for an annual production of 1.5 million tons of heavy plate in thicknesses from 6 to 200 millimeters. The main sales markets for the plates are the shipbuilding and construction industries.

We supplied the main equipment such as the descaler, the finishing stand with edger, the plate cooling system with pre-leveler, the hot-plate leveler, two cooling beds, the four-shear shearing line, and the cold-plate leveler.

Included in the plant is an innovative cooling system that achieves very high cooling rates and varied cooling patterns for a wide range of sophisticated steel grades

Designed as a pure spray-cooling system, this section features high-pressure cooling at the front end and low-pressure cooling at the rear end.

The heavy plate rolling mill operates with X-Pact® level 1 and level 2 automation. Prior to commissioning, the automation system underwent integration testing (Plug & Work) to check and optimize it.

VDM METALS SIEGEN: FAST MODERNIZATION

It took a stoppage time of just five weeks in summer 2013 for SMS Siemag to modernize the plate rolling mill of Outokumpu VDM GmbH in Siegen (Germany). Now equipped with the new 2.7-meter four-high mill stand, VDM can, in the future, supply products with narrower geometric tolerances and produce higher unit weights.

The modernization of the rolling mill comprised a new four-high mill stand with electrics and automation, feed and output transport from the furnaces to the cropping shear, and a new scale washer. Apart from completely assembling and installing the units, we also adapted the foundations.

The new mill stand is designed for a rolling force of 60 MN. Featured here are not only mechanical, but also hydraulic roll adjustment.

WUHAN IRON AND STEEL: COILER MODERNIZATION

Another longstanding customer, Wuhan Iron & Steel (China) awarded SMS Siemag the contract to revamp coiler No. 3 in its hot strip mill No. 2. Originally, the hot strip mill was supplied by SMS Siemag in 2003. It was the first hot strip mill in China for strip widths of more than 2,000 millimeters. What Wisco gains from the revamp is an expansion of its product range in the area of high-strength steels and pipe grades. This means that, after the coiler upgrade in early 2015, Wuhan Iron & Steel will be able to wind pipe grades of strength class X100 up to a thickness of 20 millimeters.

To meet these requirements, equipment including a new reel mandrel, mandrel gear unit, pinch roll unit, and hydraulic valve stands was installed. Equally important is reliable discharging and safe handling of the coils, so the coiler is also fitted with an improved coil transfer car and our patented coil hold-down device.

Our experts will upgrade the coiler automation for coiling high-strength strip and install new control desks and HMI (human machine interface) operator screens. Furthermore, we supplied the complete drive package for the reel mandrel and the pinch roll unit of coiler No. 3.

MAJOR ORDERS

- Baosteel Zhanjiang Iron & Steel Co. Ltd. China; high-performance hot strip mill
- E.P.S. Siderúrgica Nacional C.A., Venezuela; heavy plate rolling mill
- ArcelorMittal Gent, Belgium; modernization of drive rods F1 and F3
- ArcelorMittal Bremen, Germany; sampling station
- NAN YA Plastics Corp., Vietnam; grinding machine
- Novolipetsk Steel, Russia; modernization of hot rolling mill 2000
- VDM Metals GmbH, Germany; cold plate leveler
- Severstal Columbus, USA; modernization of CSP® hot strip mill
- Wuhan Iron & Steel Co. Ltd., China; coiler modernization

COMMISSIONING PROJECTS

- Baotou Iron and Steel Co. Ltd., China; hot strip mill
- Hyundai Steel, South Korea; 4.3-m heavy plate mill
- Nanjing Iron & Steel Co. Ltd., China; 5.0-m heavy plate mill
- VDM Metals GmbH, Germany; 2.7-m heavy plate mill
- Outokumpu Stainless AB, Sweden; cold plate leveler
- Salzgitter Mannesmann Grobblech GmbH, Germany; cross-cutting shear



Location: USA

UPGRADE FOR SEVERSTAL COLUMBUS

Currently SMS Siemag is upgrading a CSP® plant for Severstal Columbus, Mississippi (USA). The modernization involves strengthening the drive rod for mill stand F1, among other things with a 2-stage main gear, new equipment, and a new slab centering system for the rolling mill, reinforcement of the laminar cooling, and a new cooling model. All this will enable Severstal Columbus to increase the capacity and the product quality of the CSP® plant supplied by SMS Siemag in 2007. Equally significant, the company can also save production and maintenance costs.

The new main gear for mill stand F1 features double-helical, case-hardened toothing so that Severstal Columbus can increase the rolling torque. Thanks to the innovative design, the new two-step main gear can be installed during a very short stoppage time.

To upgrade the cooling system, the SMS Siemag experts will replace the first four of a total of ten sections with a super-reinforced laminar cooling that applies substantially more water. The resulting higher cooling rates mean Severstal Columbus can save alloying agents when producing micro-alloyed steels and also expand its existing range by high-strength steel grades.



View of the CSP® plant at Severstal Columbus supplied in 2007.

In the first four cooling groups of the laminar cooling system, super-reinforced units and the new edge-masking system were installed.



COLD ROLLING MILLS



- Improved coiler strategies for increased performance and enhanced product quality
- New emulsion systems cut energy consumption and investment costs
- Cold strip plant for automotive qualities in large widths

2013



Due to the low market volume in 2013, both order intake and sales declined. Overcapacities, increasing project financing difficulties, and poor profits at our customers caused them to shelve many projects. The majority of projects were awarded in China, India, and South-East Asia. It is likely that the market volume will remain low in 2014. However, we see increased demand for plants producing special qualities and for revamps. There is also reason to expect a gradual upturn on the Russian market as well as greater project activity in India. Meanwhile, in the threshold and emerging economies, a growing market for simple steel grade processing plants is evident.

Responding to this situation, we are driving the development of compact, high-power cold rolling mills designed to reduce investment and operating costs. The development of components and systems such as new coiler types improves product quality and increases yields. Furthermore, innovative emulsion plants cut both energy and investment costs.

ECU COMPACT EMULSION UNIT

One drawback of conventional emulsion plants is their large footprint. That's why SMS Siemag has developed its Compact Emulsion Unit (ECU). What makes the ECU such a breakthrough are its modular design, compact size, high degree of pre-assembly, and short installation and commissioning times. All this cuts energy costs, maintenance outlay, and overheads.

COLD STRIP PRODUCTION FOR AUTOMOTIVE QUALITIES WITH LARGE STRIP WIDTHS

In April 2013, Chinese company Bengang Steel Plates Co. Ltd. (Benxi) placed an order with SMS Siemag for a pickling tandem mill and two continuous annealing lines complete with two inline skin-passing mills. Starting in summer 2015, the new plants will produce a total of over 2.2 million tons per year of high-quality cold strip.

These will be the first production plants for cold strip anywhere in the world capable of processing strip up to a width of 2,150 millimeters.

Tandem mill. The five-stand pickling tandem mill processes a wide range of materials, including low-alloyed carbon steels, high-strength and ultra-high-strength steels, multi-phase and martensitic steels. It rolls the pickled and trimmed strip to minimum final gages of 0.3 millimeters. All the mill stands are built in six-high design and feature our new combined CVC® plus and ESS (Enhanced Shifting System) technology. Working in conjunction with positive and negative work roll and intermediate roll bending, this results in a sophisticated control range for optimum adjustment of the roll gap geometry. Furthermore, the mill stands are already prepared for the later integration of Edge Drop Control (EDC®). The DS system in the final mill stand guarantees efficient strip drying. Next, the strip is wound by the compact carousel coiler. Included in the supply scope are an offline strip inspection station and an emulsion unit with a capacity of 37,000 liters per minute.

Inline skin-passing mills. Apart from the strip width they can process, the two continuous annealing lines are almost identical. Capable of a maximum width of 2,150 millimeters, line No. 1 breaks the world record. Line No. 2 is designed for narrower strip up to 1,630 millimeters wide. There are inline skin-passing mills in the exit area of both annealing lines for a perfect finish of the annealed strip. The two skin-passing mills in six-high design are also equipped for wet skin-passing. Featuring CVC® plus, work roll and intermediate bending, as well as flatness control, they ensure all strip quality requirements are met.

KYCR expands cold rolling mill in Chittagong with cost-effective plant setup

INCREASED CAPACITY FOR MINIMUM FINAL THICKNESS DOWN TO 0.09 MILLIMETERS

In May 2013, KYCR Coil Industries Limited (Bangladesh) contracted SMS Siemag to upgrade its existing CVC® plus six-high reversing cold rolling mill, which has been in operation since 2002, into a Compact Cold Mill (CCM®). Following the conversion to a CCM®, KYCR will increase its annual production capacity to approx. 170,000 tons.

Not only responsible for supplying the mechanical equipment, SMS Siemag will also install X-Pact® electrical and automation systems, including those of the existing plant section. Furthermore, we will enhance the high- and low-pressure components as well as the emulsion unit.

KYCR benefits from SMS Siemag's flexible plant design for the upgrade. This means that only the exit-side equipment such as tension reel, coil transfer car, and belt wrapper will have to be relocated. The first strip will be rolled on the CCM® in 2014.

REVERSING MILL BACK IN PRODUCTION AFTER SHORT REPAIR TIME

Following severe fire damage to the reversing cold mill at Wickeder Westfalenstahl GmbH in Wickede a.d. Ruhr (Germany) SMS Siemag was called in to repair the plant. Crucial to production at Wickeder, the reversing mill had been extensively damaged by fire and the subsequent extinguishing work.

The plant is used to roll a wide spectrum of materials. They range from soft to high-strength grades and plated material in the medium width format of 700 millimeters down to a minimum final thickness of 0.15 millimeters.

SMS Siemag supplied the mechanical equipment and was responsible for coordinating the overall assembly work. The first strip was rolled on March 18, 2013.

MAJOR ORDERS

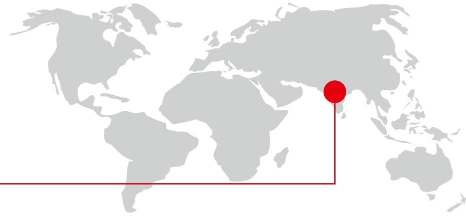
- Bengang Steel Plates (Benxi), China; pickling tandem mill (PLTCM)
- Bengang Steel Plates (Benxi), China; two inline skin-passing mills
- KYCR Coil Industries, Bangladesh; conversion of Reversing Cold Mill (RCM) to Compact Cold Mill (CCM®)
- Baotou Iron & Steel Group, China; two inline skin-passing mills
- Ansteel Company, China; inline skin-passing mill
- NAM KIM Steel, Vietnam; Reversing Cold Mill (RCM)

X-LUB PRODUCT GROUP

- Outokumpu Nirosta, Germany; PrimeLub HR TV 001 hot rolling oil
- AL EZZ DEKHEILA STEEL (EZDK), Egypt; PrimeLub HR TV 002 hot rolling oil
- ASAS Alüminyum Sanayi ve Ticaret (ASAS), Turkey; Airwash Oil 300

COMMISSIONING PROJECTS

- Wickeder Westfalenstahl, Germany; repair of Reversing Cold Mill (RCM) after fire damage
- JSW Steel, India; pickling tandem mill (PLTCM)
- Starcore, Thailand; Reversing Cold Mill (RCM)
- Shougang Jingtang, China; inline DCR (Double Cold Reduction) rolling mill
- Shougang Jingtang, China; offline DCR (Double Cold Reduction) rolling mill

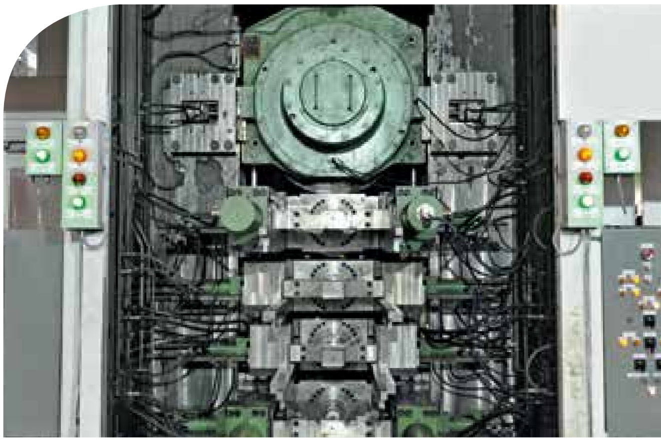


PICKLING/TANDEM MILL AT JSW STEEL IMPRESSES WITH EFFICIENCY

The new pickling/tandem mill in CVC® plus six-high design at JSW Steel Ltd. in Toranagallu in the Indian state of Karnataka has been in operation since October 2013. The Indian steel manufacturer produces high-quality cold strip on the plant. It pickled and rolled the first strip on October 19, 2013.

Now JSW has an annual production capacity of 2.3 million tons of cold strip with a maximum width of 1,890 millimeters and minimum final thickness of 0.3 millimeters. The strip is mainly destined for use in the automotive industry and includes high-strength and multi-phase steels.

The tandem mill comes equipped with combined CVC® plus/ESS (Enhanced Shifting System) technology, work roll and intermediate roll bending, multi-zone cooling, DS system, and EDC® preparation. This was the first time SMS Siemag implemented a discharge configuration consisting of a carousel coiler in conjunction with the efficient and ergonomic Rotary Inspect inline strip inspection system.



Mill stand of the tandem mill

[1] | In the 100-meter-plus turbulence pickling section, the strip is completely descaled with low resource consumption.
[2] | The JSW pickling tandem mill.





ALUMINUM PLANTS



- Improved strip qualities
- Hot and cold rolling mills for Tianjin Zhongwang
- Modernizations at Alunorf
- Luoyang Wanji: final acceptance of two cold rolling mills
- Successful start of production at Nela
- Clean exhaust air at Logan Aluminum

2013



Innovations such as special surface texturing methods further improve aluminum strip quality

In 2013, China dominated the market for new investments, yet an upturn was also noticeable in Europe and the USA, driven by lightweight automotive construction. Order intake and sales settled at a low but stable level.

It is safe to say that the automotive industry's focus on using aluminum will lead to further investments in 2014. The modernization business is also gaining in importance.

IMPROVED STRIP QUALITIES

As ever, SMS Siemag meets growing market requirements with innovative technological solutions. Take for instance the new processes developed by our experts that ensure exact control of the rolling temperatures in tandem cold rolling. This makes it possible to influence the metallurgical behavior inside the strip to create better textures. The development reduces earing in the deep-drawing process for cans.

HOT AND COLD ROLLING MILLS FOR TIANJIN ZHONGWANG

Currently, one of China's largest production facilities for aluminum flat products is being built in Tianjin. Planned in several construction stages by Tianjin Zhongwang Aluminium Co. Ltd., the aluminum complex will be completely equipped with hot and cold rolling mills by SMS Siemag. The Chinese company, so far a manufacturer of aluminum extrusion press products, is expanding on the market for aluminum flat products with the new production complex.

It was back in May 2012 that SMS Siemag received the order for the first hot rolling mills and two cold rolling mills for hard aluminum grades.

Then, in 2013, Tianjin Zhongwang tackled the implementation of the second construction phase, awarding SMS Siemag another order for rolling mills designed mainly for the production of materials used for manufacturing beverage cans. This second order comprises a 1+5 hot rolling mill consisting of a reversing rougher and a five-stand finishing train in four-high design for a minimum final gage of 2.0 millimeters as well as a one-stand cold rolling mill plus three-stand cold tandem mill, both in CVC® plus six-high design for thickness reductions to minimum final gages of 0.15 millimeters. The second construction phase will conclude with two further cold rolling mills and a strip coating line.

MODERNIZATIONS AT ALUNORF

Right now, Alunorf is investing at its Neuss location in Germany in boosting the production capacity of its hot mill No. 1, supplied by SMS Siemag in 1967.

As a first step, SMS Siemag was contracted to revamp the rougher. This job consisted of converting the unit to accommodate a new mechanical/hydraulic roll adjustment, new backup roll balancing and an upper set of backup rolls as well as replacing the stand platform and extractor hoods. Apart from supplying the mechanical equipment and modifying various media supply systems, SMS Siemag was also responsible for assembly and installation. The revamp was successfully performed during the 2013 Christmas break, and the first billet was rolled on January 3, 2014.

Later in the same month, the expected production increase on the revamped rougher was exceeded and a production record achieved.

Then, in April 2013, SMS Siemag was also awarded the contract for the second stage of the upgrade.

A new edging stand will be installed on the rougher in late 2014 to reduce downtimes. It will replace the existing, stand-alone edging stand.

Well aware of the complexity of this project, the customer contracted us not only to supply the mechanical and media systems, but also to build the foundations and perform assembly and installation. That includes sliding the pre-assembled edger into place using heavy-load lifting gear.

FOCUS ON GROWING LIGHTWEIGHT AUTOMOTIVE CONSTRUCTION MARKET

Alcoa Inc. of Pittsburgh (USA) has placed an order with SMS Siemag for a new cold rolling mill for its Alcoa plant in Tennessee, near Knoxville.

The new rolling mill is set to meet the strongly growing demand for lightweight, durable aluminum for automotive production. Alcoa has always been a major buyer of latest technologies from SMS Siemag.

SMS Siemag is one of the main suppliers for the facility in Tennessee. Not only responsible for the mechanical equipment and complete media systems, SMS Siemag will also install X-Pact® electrics and automation. This will provide all the control systems required for reliable production of the high surface quality demanded by the automotive industry. Further included in the supply scope are Multi-Plate® filters from SMS Siemag for cleaning the rolling oil plus an Airwash™ system for exhaust air cleaning.

To ensure smooth commissioning, the drive systems, control systems, and process models will undergo extensive integration tests in Germany

SUCCESSFUL START OF PRODUCTION AT NELA

Following smooth commissioning, our Chinese customer Northeast Light Alloy Co. Ltd. (NELA) took over the single-stand aluminum cold rolling mill from SMS Siemag at the end of November 2013. The plant has increased NELA's annual production capacity at its Harbin location in Heilongjiang Province by 85,000 t of aluminum cold strip. It comes with technological features such as CVC® plus, Hot Edge Spray, and DS systems. The strip produced has a maximum width of 1,900 millimeters and is rolled to a minimum thickness of 0.1 millimeters. The mill was specifically designed to produce hard aluminum alloys.

CLEAN EXHAUST AIR AT LOGAN ALUMINUM

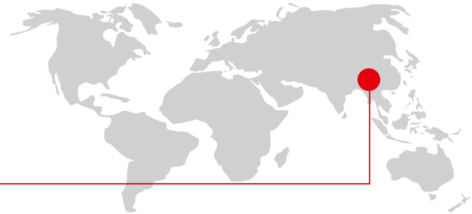
Logan Aluminum Inc., Kentucky (USA) placed an order with SMS Siemag for an Airwash™ exhaust air cleaning system. This Airwash™ system replaces the existing active-carbon air purifying plant. Successfully commissioned in 2013, the Airwash™ system treats more than 320,000 cubic meters of air per hour. Also included in the scope of supply was "Airwashöl 300" oil from SMS Siemag.

MAJOR ORDERS

- Alcoa Inc., USA; cold rolling mill
- Tianjin Zhongwang, China; 1+5 hot rolling mill
- Tianjin Zhongwang, China; CVC® plus six-high cold rolling mill
- Tianjin Zhongwang, China; three-stand CVC6 cold tandem mill
- Aluminium Norf, Germany; edging stand for hot rolling mill

COMMISSIONING PROJECTS

- Shandong Weiqiao Aluminium Electricity Co. Ltd., China; 1+4 hot rolling mill, CVC plus® six-high cold rolling mills, 1 and 2 three-stand CVC6 cold tandem mill
- Northeast Light Alloy (NELA), China; CVC® plus six-high cold rolling mill
- Logan Aluminum, USA; Airwash™ exhaust air cleaning system
- Aluminium Norf, Germany; modernization of the rougher in hot rolling mill No. 1
- Alnan, China; 1+1 hot rolling mill
- Novelis Yeongju, Korea; 2-stand cold tandem mill



PRODUCTION STARTED AT SHANDONG WEIQIAO

There was reason for satisfaction at the Zouping location of Chinese aluminum producer Shandong Weiqiao Aluminium & Electricity Co. Ltd. in fall 2013. That was when the 1+4 hot rolling mill and the first cold rolling mill were successfully commissioned. Soon afterward, the cold tandem mill also went into production, and the first strip was rolled on it at the end of 2013. The plants are part of an order SMS Siemag received in summer 2011 from the Chinese aluminum producer. Apart from the hot rolling mill, SMS Siemag is supplying a total of three cold rolling mills including the associated balance of plant.

1+4 hot rolling mill. Capable of rolling strip up to 2,200 millimeters wide, the hot rolling mill consists of an edging stand, rougher, heavy and light cropping shears, four-stand finishing mill, and finishing equipment including side trimmer and coiler. It comes equipped with hydraulic adjustment, roll bending, and CVC® technology. These control elements ensure the mill meets all requirements for thickness, profile, and flatness of the aluminum strip. The minimum final gage that can be produced in the finishing train is 1.8 millimeters. The hot rolling mill started production on October 23, 2013.

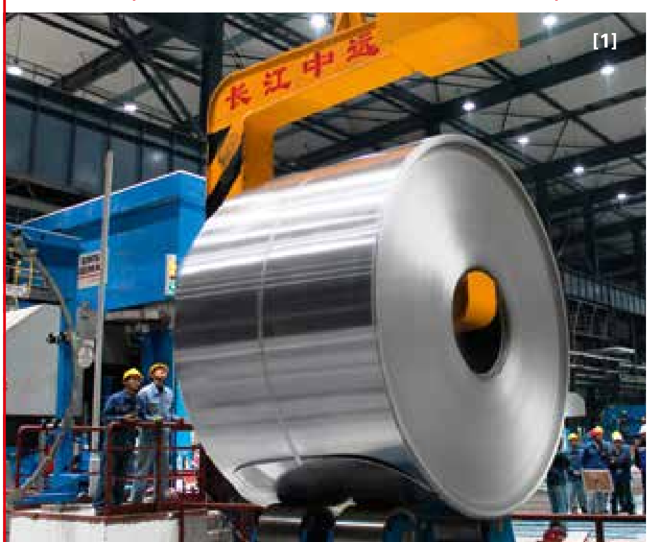
Cold rolling mills. To further process the aluminum hot strip, Shandong Weiqiao will use three cold rolling mills from SMS Siemag. This section consists of two individual mill stands and one three-stand tandem mill, all featuring CVC® plus technology and built in six-high design. The Hot Edge Spray system and multi-zone cooling guarantee equally high strip quality from the center through to the strip edges. Also included is a Dry Strip system to minimize oil residues on the strip surface.



Successful production start of the 1+4 hot rolling mill at Shandong Weiqiao.

Everything came together on September 9, 2013 when Cold Rolling Mill No. 1 successfully produced the first strip. The single-stand plant rolls strip up to 2,150 millimeters wide with a large input thickness of up to 10 millimeters. After processing, the minimum final gage is 0.2 millimeter. Yet the other two cold rolling mills achieve even thinner strip. The tandem mill also successfully went into operation on December 28, 2013.

[1] | The first coil from the hot strip mill and [2] | winding the first coil in the cold rolling mill.





STRIP PROCESSING LINES



- Enhanced market position in continuous annealing lines for high-strength and ultra-high-strength steels
- Two new references for hot-dip annealing lines strengthen automotive competence
- Continued success in aluminum plants with new color coating line

2013



In 2013, the Division was able to significantly strengthen its market position, although the market as a whole stagnated at a low volume. Despite a difficult market situation with high price pressure, our order intake increased. Thanks to orders for a total of 11 new plants and six air-knife systems for hot-dip galvanizing lines, the Division defended its leading position.

Particularly worth mentioning is the even stronger market leadership in continuous annealing lines for high-strength and ultra-high-strength automotive steels, with six new orders. Just as gratifying was a boost to our market position in automotive hot-dip galvanizing lines with two new reference plants. We also continued our successes in the area of aluminum lines by securing a further order.

Due to the weaker order intake in 2012, sales decreased slightly but remain at a high level. Next year, we expect sustained tough price competition with a slight rise in project volume.

SIX CONTINUOUS ANNEALING LINES

In 2013 SMS Siemag attracted orders for six continuous annealing lines in China. They are all intended for manufacturing high-strength automotive grades and feature advanced cooling systems

Chinese company BISG Baotou Iron & Steel Group placed an order with SMS Siemag for two continuous annealing lines, including 6-high inline skin-passing mills. Almost identical in design, the lines are core features of the new cold rolling mill No. 2 being built by BISG in the autonomous region of Inner Mongolia.

Starting in 2016, the two lines will produce annually more than 1.5 million tons of high-quality annealed cold strip for the automotive industry – including external body qualities and high-strength grades such as DP and TRIP, with tensile strengths of up to 980 MPa.

Benxi (Bengang Steel Plates Co. Ltd.) (China), has ordered two continuous annealing lines from SMS Siemag. The lines belong to cold rolling mill No. 3 in Liaoning Province, northern China. They will produce almost 2 million tons of high-quality steel strip, including high-strength grades such as DP and TRIP as from the summer of 2015. Special here is the record strip width. This will be the first time worldwide that strip of this type will be manufactured in widths of up to 2,150 millimeters.

Angang (Angang Company Limited) ordered a continuous annealing line for its works in Anshan, Liaoning Province. The line is designed to produce some 600,000 tons of steel strip per year for manufacturing ultra-high-strength automotive structural components that simultaneously increase the safety and reduce the weight of vehicles. It is scheduled to go into production at the end of 2015.

Another steel producer in China contracted SMS Siemag to supply a continuous annealing line with water-spray cooling system. This means that, as from late 2015, the company's plant in Hebei Province, northern China, will produce 450,000 tons of steel strip per year for the manufacture of high-strength automotive structural parts. Following the successful commissioning of a first annealing line in 2010, the company is again relying on our technology and expertise.

PICKLING TANDEM MILL FOR RECORD STRIP WIDTHS

In April 2013, Benxi (Bengang Steel Plates Co. Ltd.) ordered a pickling tandem mill. This line is also part of the new cold rolling mill No. 3 in Liaoning Province, northern China. It is capable of a record strip width of 2,150 millimeters. The pickling tandem mill features an extremely efficient turbulence pickling system and a five-stand tandem mill in six-high design, equipped with our new combined CVC®plus/ESS technology. The annual capacity is approx. 2.3 million tons, including ultra-high-strength and martensitic steels.

TWO HOT-DIP GALVANIZING LINES

Key advantages of the hot-dip galvanizing lines are the modern air-knife systems and, among other things, the Drever annealing furnaces. These come with high cooling rates as well as efficient and eco-friendly operating

Benxi (Bengang Steel Plates Co. Ltd.) and Angang (Angang Steel Company) ordered one hot-dip galvanizing line each for their plants in China. Both lines are set to supply the expanding Chinese market for high-quality, galvanized automotive plate. They are each capable of producing 450,000 to 500,000 tons of galvanized or galvannealed steel strip per year, including deep-drawing and modern high-strength steel grades. Apart from structural components, the product range also covers strip with top surface quality for automotive exterior body parts. The two lines are scheduled to go into production at the end of 2015.

CONTINUOUS PICKLING LINE

A customer in Turkey placed an order with SMS Siemag for a continuous turbulence pickling line. It will have an annual capacity of 1.3 million tons and process strip in widths of 600 to 1,550 millimeters at thicknesses of between 1.5 and 5.0 millimeters.

COLOR COATING LINE FOR ALUMINUM

We received an order from a Chinese aluminum manufacturer for a color coating line. It is designed to produce 50,000 tons of coated aluminum strip per year. This material is mainly used for manufacturing beverage cans.

The outstanding feature of the plant is its compact coating process. That involves chemical pre-treatment of the strip, color coating, and drying in the furnace – with all the stages ideally harmonized with each other. The result? High product quality with low consumption of resources and energy.

MAJOR ORDERS

- Bengang, China; two continuous annealing lines
- Bengang, China; continuous pickling tandem mill
- China; color coating line for aluminum can material
- BISG Baotou Iron & Steel Group, China; two continuous annealing lines
- China; continuous annealing line with water-spray rapid cooling
- Angang Steel, China; continuous annealing line
- Bengang, China; hot-dip galvanizing line
- Angang Steel Company, China; hot-dip galvanizing line
- Turkey; continuous pickling line

COMMISSIONING PROJECTS

- PRO-TEC Coating Company, USA; continuous annealing line with water-spray rapid cooling
- Hyundai Hysco, South Korea; universal annealing and hot-dip galvanizing line
- Hyundai Hysco, South Korea; hot-dip galvanizing line
- Hyundai Hysco, South Korea; X-Pro® laser welding machine
- JSW, India; pickling tandem line with X-Pro® laser welding machine
- Shougang Jingtang, China; two electrolytic tin-plating lines
- Shougang Jingtang, China; continuous tinplate annealing line
- Shagang, China; hot-dip galvanizing line



USA: CONTINUOUS ANNEALING LINE FOR PRO-TEC COMMISSIONED

Ultra-high-strength steels for the automotive industry. PRO-TEC Coating Company (USA) has successfully commissioned its continuous annealing line for ultra-high-strength steel strip. The line was supplied by SMS Siemag and erected in Leipsic, Ohio. The first coil was produced on February 28, 2013 – in top quality. Not only responsible for the design and engineering of the mechanical equipment, SMS Siemag also supplied the entire electrics and automation.

The line can produce around 500,000 tons per year of high-strength steel strip for cars, trucks, and SUVs. To achieve the required metallurgical properties in the finished material, the effects of cold hardening caused by the rolling process must be reduced. That's where the annealing process comes in, along with downstream intensive cooling and the overaging zone. It takes between 20 and 25 minutes for a coil to complete the entire process from the start to the finish of the annealing line.



PRO-TEC is a joint venture between US Steel Corporation (USA) and Kobe Steel Ltd. (Japan).

[1] | Even quality of the first coil was in line with the market requirements. **[2] |** Good cooperation: David Hathaway, Project Leader, US Steel, and Bernard Natt, Project Leader, SMS Siemag.





FURNACE TECHNOLOGY



- Strong market position in carbon steels
- New furnace technology for finish annealing and coating lines
- Successes on heavy plate and aluminum markets
- Orders for six radiant-tube furnaces in cold strip lines
- Efficient heat treatment at Outokumpu (Sweden)

2013



Following runup, both furnaces operated continuously over the first five months, producing among other materials HiB in low-temperature processes

Compared to the previous year, total order intake in 2013 increased by almost 30%, while sales fell due to the weaker order intake in 2012.

The market volume for carbon steel increased significantly on the previous year. Despite the difficult market situation, we were able to defend our strong position. Moreover, we achieved initial successes on the heavy plate and aluminum market. Yet there is still fierce competition here from the established suppliers.

NEW FURNACE TECHNOLOGY FOR FINISH ANNEALING AND COATING LINES

Just one year after the issue of the order, the two Ares furnaces in the finish annealing and coating lines at Wisco (Wuhan Iron & Steel) went into production. The furnaces feature new technologies for both thermal straightening and cooling the strip. They mainly improve the surface quality and process control.

Now Wisco has increased its production capacity for GO (grain oriented) electrical strip including high-permeability strip (HiB) by a total of 180,000 tons per year. The material produced contains up to 3.5% silicon and is mainly used in high-power transformers.

A TOTAL OF SIX RADIANT TUBE FURNACES FOR COLD STRIP LINES

Furnaces for two hot-dip galvanizing lines for Benxi and Angang. Benxi (Bengang Steel Plates Co. Ltd.) and Angang (Angang Steel Company) each ordered one Drever radiant tube furnace for their new hot-dip galvanizing lines in China. Both lines are set to supply the expanding Chinese market for high-quality, galvanized automotive plate.

The furnaces can be used to produce almost 500,000 tons per year (Benxi) and 450,000 tons per year (Angang) of galvanized or galvannealed steel strip, including deep-drawing steels and modern high-strength grades.

Apart from structural components, the product range also covers strip with top surface quality for automotive exterior body parts. Both furnaces will go into production at the end of 2015. Outstanding properties of the Drever furnaces are their high cooling rates with efficient and eco-friendly operation, high capacity, and broad product range.

Furnaces for two continuous annealing lines. Benxi (Bengang Steel Plates Co. (China)) contracted SMS Siemag to supply the furnaces for two continuous annealing lines. The lines belong to cold rolling mill 3 in Liaoning Province, northern China. Starting in the summer of 2015, over two million tons of high-quality steel strip will be produced here. That will include high-strength grades such as DP (dual phase) and TRIP (transformation induced plasticity). Extra special are the record strip widths of up to 2,150 millimeters.

Furnaces with water-spray cooling system. Angang (Angang Company Limited) (China) ordered a radiant-tube furnace for its new continuous annealing line in Anshan, Liaoning Province. The line is designed to produce some 600,000 tons of steel strip per year for manufacturing ultra-high-strength automotive structural components that simultaneously increase the safety and reduce the weight of vehicles. It is scheduled to go into production at the end of 2015.

Another Chinese customer contracted SMS Siemag to supply a radiant-tube furnace with water-spray cooling system for a continuous annealing line. This means that, as from late 2015, the company's plant in Hebei Province, northern China, will produce 450,000 tons of steel strip per year for the manufacture of high-strength automotive structural parts.

FLOATER FURNACE FOR ALUMINUM COLOR COATING LINE

We supplied a floater furnace for a new color coating line to a Chinese aluminum producer. The furnace is designed for a production of 50,000 tons of coated aluminum strip per year. This material is mainly used for manufacturing beverage cans.

Nozzles in the floater furnace ensure the strip travels contact-free through the furnace and air cooler in a sinus shape. Throughout the furnace length, hot air heats the strip evenly and keeps it afloat on an air cushion. The elimination of mechanical contact in the furnace translates into a flawless strip surface.

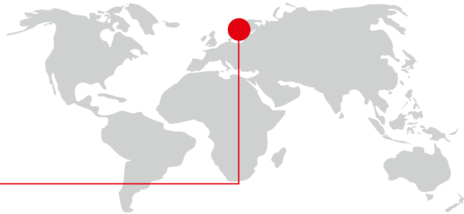
Following extraction, the flue gases are burned in an afterburning system with a thermal effectiveness of up to 98%. Depending on the solvent content in the exhaust air, the afterburning system and the furnace can be operated without additional energy input. This means it is possible to operate the furnace in autothermal mode for a large product range.

MAJOR ORDERS

- Benxi, China; furnace for hot-dip galvanizing line
- Angang Steel Company, China; furnace for hot-dip galvanizing line
- China; furnace for continuous annealing line with water-spray rapid cooling
- Angang Steel, China; furnace for continuous annealing line
- Benxi, China; furnaces for two continuous annealing lines
- China; furnace for color coating line for aluminum can material
- Guangxi Beihai Chengde, China; two furnaces for stainless steel cold strip annealing and pickling lines
- Ningbo, China; slab heating furnace
- Volkswagen Engine, China; furnace for aluminum alloying
- Gloria Material Technology, China; chamber furnace

COMMISSIONING PROJECTS

- Hyundai Hysco, South Korea; furnace for universal annealing and hot-dip galvanizing line
- Hyundai Hysco, South Korea; furnace for hot-dip galvanizing line
- PRO-TEC Coating Company, USA; furnace for continuous annealing line with water-quench rapid cooling
- Shagang, China; furnace for hot-dip galvanizing line
- Outokumpu Stainless, Sweden; two tempering furnaces and one quencher for stainless steel heavy plate thermal treatment line
- ArcelorMittal St-Chély d'Apcher, France; furnace for electric strip annealing and coating line
- Wuhan Iron & Steel, China; furnaces for two electric strip finish annealing and coating lines



OUTOKUMPU STAINLESS AB

Location: Sweden

EFFICIENT TREATMENT

Commissioning projects at Outokumpu AB. In August 2013, Outokumpu Stainless AB commissioned a new thermal treatment line for stainless steel plate including a water supply system for its Degerfors location in Sweden. This upgrade extends the company's capacity for thermally treated plate and enables it to further improve product quality. Included in the SMS Siemag scope of supply were two thermal treatment furnaces with the associated charging machines and a quencher. Also part of the job was connecting the equipment to upstream and downstream areas. The furnaces can handle plates with maximum lengths of 16 meters and weights of up to 30 tons. The maximum annealing temperature is over 1,200 °C. Furthermore, the furnaces comply with the latest environment-protection requirements.

Outokumpu is a leading manufacturer of stainless steels, and in Degerfors it manufactures heavy plate for challenging applications in the paper industry, power stations, oil and gas conveyance, and desalination plants.



The thermal treatment line is equipped with our X-Pact® electrics and automation.

[1] | Two thermal treatment furnaces with [2] | directly linked quencher.





ELECTRICS AND AUTOMATION



- Tailor-made solutions for improved production sequences
- New microstructure models ensure quality of hot strip and plate
- Energy management for electric arc furnaces proven in practice
- Newly developed low-voltage frequency converter especially for the metal industry

2013



This microstructure simulator enables the operator to systematically examine the effects on the mechanical properties of the product

In 2013, our Electrics and Automation Division increased order intake against the previous year. Compared to 2012, sales were down. Looking ahead to 2014, we expect similar order intake and stable sales on a low level.

DEVELOPMENTS FOR AN OPTIMIZED PRODUCTION PROCESS

To ensure their business success, our customers demand performance-enhancing solutions. That's why our Electrics and Automation Division continuously develops new products and technologies that improve the production process in our customers' plants and also reduce costs.

MICROSTRUCTURE MODEL FOR HOT STRIP AND PLATE

Working intensively over recent years, SMS Siemag experts have developed a microstructure model for hot strip and plate that can be used to guarantee the required mechanical properties. What is more, it reduces the need for sampling.

The model serves as both a microstructure monitor and simulator. When applied as a monitor, the model calculates the mechanical properties along the length of every product at the end of the rolling process.

LOW-VOLTAGE FREQUENCY CONVERTER

To increase its competitiveness, SMS Siemag joined forces with a market-leading manufacturer of converters and developed its own product: a standardized and modular drive solution for low-voltage converters. The system is specially designed to meet the high demands of the metals industry – from steelmaking plants to rolling mills to strip processing lines. Built for maximum convenience, the structure of the converter switch cabinets is largely pre-configured. The operator selects the power unit, then the peripherals are simply adjusted to the specific drive task. All the inverters are connected to a common DC busbar centrally supplied by a feeder unit.

SMS Siemag supplies exclusively type-tested and practice-proven converter technology. Also when it comes to maintenance, SMS Siemag sets new standards.

It is easy to replace the components without special tools or lifting equipment. Larger power parts are extendable.

ENERGY OPTIMIZATION SYSTEM FOR ELECTRIC ARC FURNACES

Increasingly important, the issue of energy management is also reflected in the energy optimization system we have developed for electric arc furnaces. Our FEOS (Furnace Energy Optimization System) continually observes the overall process and optimizes all the main energy-relevant factors. These are the electrical and chemical power as well as the addition of injected carbon and DRI or HBI. The foam slag regulation included here supports the optimization of the energy input into the melt. FEOS has already proven its practical viability. Implemented in a reference plant at Peiner Träger, the system reduces waste electrical and chemical energy as well as carbon injection, and also shortens the melting time. It has been revealed in long-term tests that an electric arc furnace operated with FEOS achieves an improved production process and saves energy.

THE TRANSPARENT PLANT

Integrated in the plant automation system, the Plant Condition Adviser system from SMS Siemag makes the condition and operational readiness of the plant transparent. The solution can be used to monitor complete mechanical-electronic systems such as the looper of a strip processing line, the bottom purging of a BOF, or the bending and shifting systems of rolling mills as well as checking the electronic plant components. The Plant Condition Adviser detects unfavorable operating conditions and indicates when the wear limits of individual plant parts are reached.

MAJOR ORDERS

METALLURGICAL TECHNOLOGY

- Tata Steel, Netherlands; electrics and automation for alteration of a BOF converter
- Société du Nickel de Nouvelle-Calédonie et de Corée (SNNC), South Korea; electrics and automation for a ferronickel submerged-arc furnace
- Visakhapatnam Steel, India; electrics and automation for a BOF converter
- EPS Siderúrgica Nacional (EPSSN), Venezuela; electrics and automation for an electric steelmaking plant
- PT Aneka Tambang (Antam) Tbk, Indonesia; electrics and automation for alteration of a submerged-arc furnace
- Mississippi Silicon LLC, USA; electrics and automation for a silicon reduction plant

CONTINUOUS CASTERS

- Siderúrgica Nacional, Venezuela; electrics and automation for a slab continuous caster

HOT ROLLING MILLS

- Outokumpu Stainless AB, Sweden; modernization of the automation for a Steckel rolling mill
- EPS Siderúrgica Nacional (EPSSN), Venezuela; electrics and automation for a heavy plate mill
- Baosteel Zhanjiang Iron & Steel Co., Ltd., China; profile, contour, and flatness control for a hot strip mill
- Outokumpu VDM GmbH, Germany; electrics and automation for a cold plate leveler
- International Economic & Trading (Wuhan Iron & Steel (Group) Corp.), China; electrics and automation for alteration of a coiler
- Severstal Columbus, USA; automation for alteration of a CSP® rolling mill and the laminar cooling section

COLD ROLLING MILLS

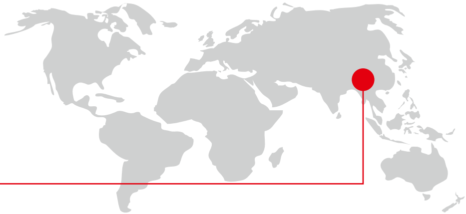
- KYCR Coil Industries Ltd., Bangladesh; electrics and automation for conversion of a single-stand reversing cold rolling mill into a two-stand reversing cold rolling mill

ALUMINUM PLANTS

- Alcoa Inc., USA; electrics and automation for a two-stand aluminum cold rolling mill
- Tianjin Zhongwang Aluminium Co. Ltd., China; electrics and automation for a 1+5 aluminum hot strip mill, two single-stand aluminum cold rolling mills, and one three-stand aluminum cold rolling mill

STRIP PROCESSING LINES

- China; electrics and automation for a color coating line for aluminum strip
- Angang Steel Co., Ltd, China; electrics and automation for a continuous annealing line
- Angang Steel Co., Ltd, China; electrics and automation for hot-dip galvanizing line
- China; electrics and automation for a continuous annealing line



SHANDONG TAISHAN STEEL GROUP CO. LTD.

Location: China

SUCCESSFUL MODERNIZATION

Now the Shandong Taishan Steel Group Co. Ltd. (China) can produce 1.8 million tons per year of hot broad strip on its Steckel mill. That's because SMS Siemag revamped the plant with a new automation system.

Located in Laiwu, Shandong Province, the Steckel rolling mill was erected in 2008 by local suppliers and originally produced 600,000 tons of hot broad strip per year. Taishan uses the plant to produce hot-rolled stainless steel and carbon steel strip for further processing in the automotive, shipbuilding, and household goods industries. Since the completion of the automation revamp in fall 2013, our customer can increase production to 1.8 million tons per year, and also has the option of manufacturing higher qualities.

Not only responsible for supplying the entire X-Pact® electrics and automation, including control systems and process models, SMS Siemag also supervised assembly and commissioning. Furthermore, a new HMI system and control desks ensure ergonomic working. Also included in the supply package were medium-voltage converters for the main drives on three new finishing stands, and low-voltage converters for the main drive of the new second coiler.



The contract-signing ceremony for the revamp project.

[1] | Rougher with edging stand. [2] | Steckel rolling mill with cooling system.





SERVICE



- Global service network expanded
- Experts accomplish over 150 assignments
- Maintenance strategies in demand
- European Repair Center opened
- TECademy trains more than 270 participants

2013



What makes our maintenance services particularly attractive is their high technical standard and availability due to our global network of service workshops

FAST, COMPETENT, AND RELIABLE

That's what makes service from SMS Siemag stand out. Once again in 2013, our service staff provided more than just spare parts. Our global service network offers solutions that guarantee customers the safe and cost-effective operation of their plants over the entire service life. Whether spare parts, maintenance, or complex revamps of existing plants: SMS Siemag service solutions are more in demand than ever before.

EFFECTIVE MAINTENANCE

Once again, the issue of servicing and maintenance was very important in 2013. Even when placing new orders, customers asked about maintenance strategies. That happened for instance when SMS Siemag supplied four submerged-arc furnaces to JSC TNK Kazchrome of Kazakhstan. SMS Siemag set up the complete in-house maintenance system for the customer to ensure high plant availability and rapid reaction in case of disruptions.

150 ON-SITE ASSIGNMENTS

Our service experts supported steel and nonferrous metals plant operators in more than 150 field assignments. They performed inspections of several converters, replaced transmissions in hot strip mills, and analyzed faults that caused vibration problems. Our service teams received orders from Bilstein (Germany), ArcelorMittal (France), and Alcoa (USA) to install Genius CM (Conditioning Monitoring), and from Kazchrome (Kazakhstan) to set up our IMMS® (Integrated Maintenance Management System).

TECADEMY CUSTOMER ACADEMY

The TECademy training academy attracted more than 270 participants in 2013 with its hands-on instruction and expert know-how. Available from SMS Siemag are both standard training courses and customized programs. They cover technology, maintenance, and servicing. For example, SMS Siemag trained employees from Bilstein, both in Hilchenbach and on site at the customer's own plant. "The training prepared us very well for work at the plant. The test components used for simulation purposes were particularly effective," says Ufuk Karvan, one of the customer's course participants.

SPARE PARTS

Last year, SMS Siemag opened its own "European Repair Center" in Germany. The result was improved order processing and on-time delivery. There was a special focus on repairs of shears, mandrels, spindles, and CVC® shifting. We received major spare parts orders from customers, including EZDK (Egypt), VEGA (Brazil), Baoshan (China), and Outokumpu (Finland). Our service experts repaired two mandrels for ArcelorMittal (Germany).

EXPERTS FOR COATING

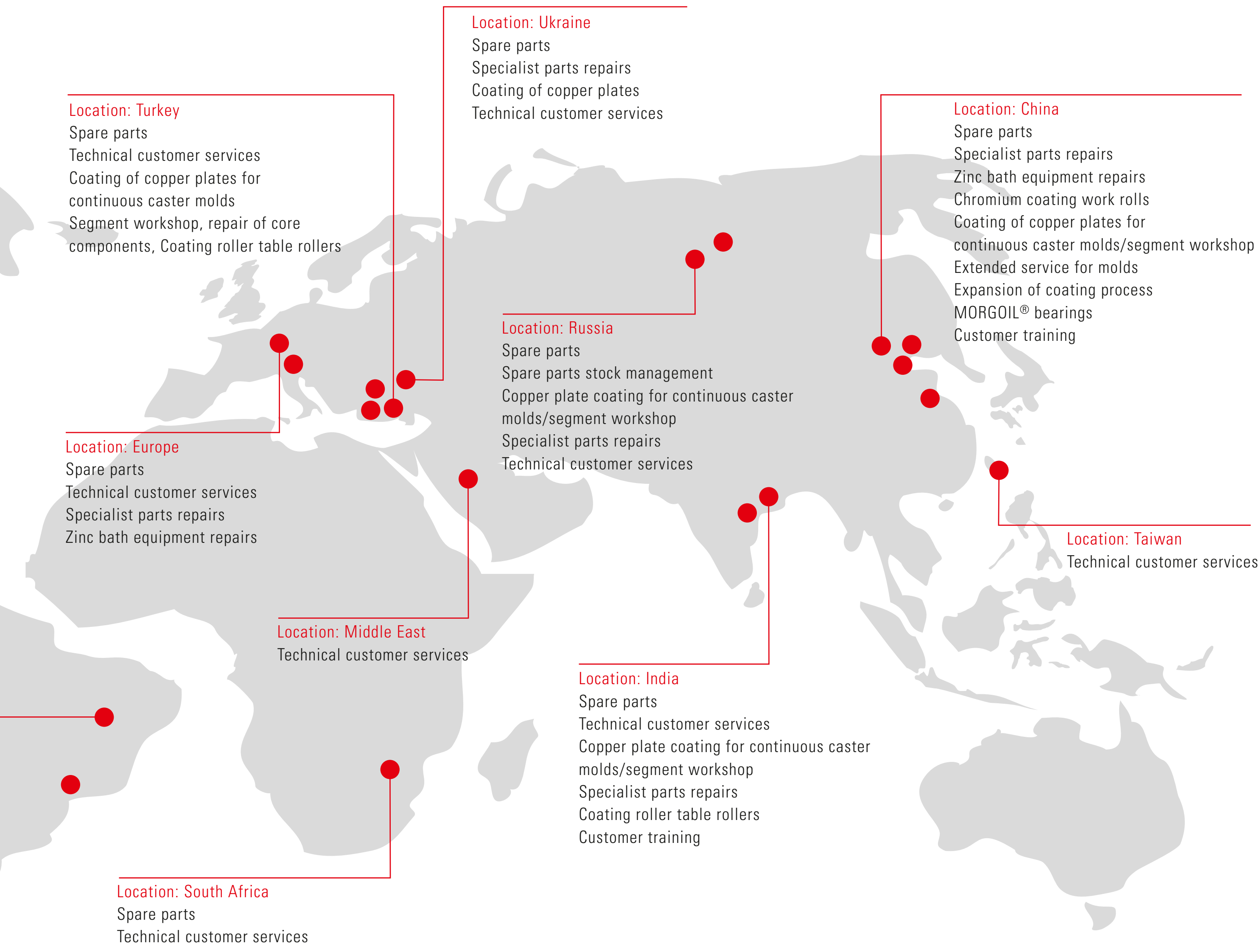
Many customers in 2013 found SMS Siemag to be the ideal partner for coating rolls and molds. Tata Steel of India placed an order for several CSP® mold copper plates. Further orders came from Germany, Spain, Russia, and Mexico. Apart from CSP® copper plates, SMS Siemag also supplies copper plates for conventional casting machines, as well as mold coating using the UniGuard® system, a ceramic coating process.

A plasma soldering unit for coating Morgoil roll-neck bearings was commissioned in the Chinese workshop in Suzhou. Major orders for Morgoil bearings in 2013 were issued by Formosa Ha Thin (Vietnam), NLMK (Russia), and ArcelorMittal Gent (Belgium).

SERVICE CLOSE TO CUSTOMERS

A global network of service locations guarantees closeness to customers. We have more than 1,500 employees at 40 locations. In 2013, we opened a new service workshop in Ukraine to support the steel industry in the Donetsk region. Our experts there coat copper mold plates, recondition segment rolls, and perform repairs and maintenance on continuous casters. Further workshops will open in Indonesia and India in 2014.




Location: Ukraine
Spare parts
Specialist parts repairs
Coating of copper plates
Technical customer services
Location: Turkey
Spare parts
Technical customer services
Coating of copper plates for
continuous caster molds
Segment workshop, repair of core
components, Coating roller table rollers
Location: China
Spare parts
Specialist parts repairs
Zinc bath equipment repairs
Chromium coating work rolls
Coating of copper plates for
continuous caster molds/segment workshop
Extended service for molds
Expansion of coating process
MORGOIL® bearings
Customer training
Location: Russia
Spare parts
Spare parts stock management
Copper plate coating for continuous caster
molds/segment workshop
Specialist parts repairs
Technical customer services
Location: Europe
Spare parts
Technical customer services
Specialist parts repairs
Zinc bath equipment repairs
Location: Taiwan
Technical customer services
Location: Middle East
Technical customer services
Location: India
Spare parts
Technical customer services
Copper plate coating for continuous caster
molds/segment workshop
Specialist parts repairs
Coating roller table rollers
Customer training
Location: South Africa
Spare parts
Technical customer services

SMS MEER

DECLINING ORDER INTAKE

The order intake in 2013 decreased compared to the previous year by 4% to EUR 1,104 million. In 2012, order intake was EUR 1,152 million. Sales declined slightly to EUR 1,158 million after reaching EUR 1,197 million in 2013.

There was one major reason for this: overcapacities in metallurgical plants on the global market led to a serious unwillingness of customers to invest in new equipment, and in turn to high competitive pressure. Our net result decreased correspondingly. This development affected all our Divisions, including Service.

GROWING DEMAND FOR GREEN TECHNOLOGY

Especially under today's more difficult political and economic framework conditions, our customers find it increasingly hard to predict long-term market developments and to make investment decisions based on them. However, the demand for metallurgical plant solutions that offer both economical and ecological advantages is clearly rising. This is where "Ecoplants" from SMS Meer and SMS Siemag come in.

They are particularly attractive on the Chinese market, considering the country's current pollution problems. We have identified major growth opportunities here. Meanwhile, the new Chinese government has published its plans for change in the steel industry. Included here are investments in less populated parts of the country, for instance central or western China. Larger state-owned companies such as Baosteel are relocating part of their production to other regions.

Encouraged by this situation, SMS Meer is expanding its presence in Shanghai. Already, the factory building capacity has been doubled. Furthermore, the number of employees will in the medium term be increased to 500.

Once again, in 2013 the USA market remained stable. Especially demand for tube plants continued to be strong, but domestic and foreign companies in North America are also expanding their capacities in other areas.



Marcel Fasswald,
Order Handling and Technology



Torsten Heising,
Commercial



Jens Barth,
Sales

That's why we further increased our presence on the ground. Newly integrated into our US company was Girard Associates of Ohio.

The Indian market suffered from large currency changes in 2013. The rupee plummeted in value so that Indian companies now have to pay correspondingly high prices for products from Europe. The Business Area reacted by expanding its local business in order to be able to offer projects in the Indian currency.

We are pleased to report that the demand for large metallurgical plants in the Middle East is unbroken. Here we are benefitting above all from the strong demand for turnkey solutions for long products.

COST SAVINGS DUE TO MODERNIZATION OF PRODUCTION

True to its proven principles, we continue to rely on quality manufacturing of sophisticated components in Germany. The modernization of the production shop in Mönchengladbach will be completed in 2015. Then we will have invested EUR 60 million – especially in revamping our processing machines.

SMS Elotherm has acquired the heating specialist Induktions-Anlagen+Service (I.A.S.). Furthermore, with its takeover of Tech Induction, the company has also expanded its business in North America.

SERVICE CREATES CONDITIONS FOR FUTURE GROWTH

Once again, we further developed our service business in 2013. Now, with new locations in Bahrain and Duisburg, our service experts are even closer to customers.

STEELMAKING AND CONTINUOUS CASTING TECHNOLOGY

FOR LONG PRODUCTS



- Sales slightly increased
- Continuous casting stable
- Strategic orientation toward further growth

2013



Another successful project was the supply of a new Level 1 and Level 2 automation package that enables Feng Hsin to improve both its production processes and its output

SALES SLIGHTLY INCREASED

Following a record year in 2012, SMS Concast booked a slightly lower order intake. The demand for electric arc furnaces, continuous casting technology, and secondary metallurgy for long products failed to match the previous year's level. The close cooperation within the Business Area SMS Meer continues to pay off with significant advantages for our customers. Especially in the area of minimills, our business partners benefit from solutions from one source.

Sales improved slightly on the figure achieved in 2012. Service business expanded by some 15%.

ELECTRIC ARC FURNACES, SECONDARY METALLURGY, AND CONTINUOUS CASTING TECHNOLOGY

Asil Celik in Orhangazi (Turkey) awarded us a contract for a new three-strand billet caster. The continuous caster can produce round blooms with diameters from 300 to 600 millimeters. It has an annual capacity of up to 600,000 tons per year. The three-strand billet caster will go into production in the first quarter of 2015.

Now Feng Hsin Iron & Steel has commissioned the revamped caster in its facility in Taichung City (Taiwan). The first heat produced sections of 150 millimeters square.

Apart from Level 1 and Level 2 automation, we supplied Feng Hsin with a new fifth casting strand, a hydraulic oscillating unit, a type-Z3 air-mist cooling system, a withdrawal straightening unit, and stopper boxes.

Empresa Siderúrgica Del Perú (Siderperú), a company of the Gerdau group, has upgraded its continuous caster in Chimbote (Peru), significantly improving the production process. The new mold equipment supplied by us casts 224-millimeter square sections. Installed here is a rectangular stirrer that is the first of its kind worldwide and takes up much less room than conventional solutions. So, although space was tight in the oscillator, the machine fitted easily inside it. The supply package comprises mold support, mold casing, mold tubes with CONVEX® technology, and a mold stirrer for each of the four strands of the existing 7.8-meter continuous caster.

STRATEGIC ORIENTATION TOWARD FURTHER GROWTH

Last year, SMS Concast prepared for further growth, especially in minimills and service. Working hand-in-hand, the Divisions Steelmaking Plants and Continuous Casting Technology offer an integrated process for all-inclusive plants covering everything from quotations through order processing to after sales service.

New premises were opened at three locations. Our team in Tarcento (Italy), moved into a new building. This closeness to other SMS companies ensures even better customer support.

Engineering capacities at our Indian location in Pune were further expanded with the opening of a new building.

Finally, in China our newly founded subsidiary also moved into new premises in 2012. That gives them plenty of scope for further expansion, especially to support services in the Asian region.

MAJOR ORDERS

MINIMILLS
– BISW (The Bangkok Iron & Steel Works), Thailand; secondary metallurgy and continuous caster for SBQ billets, with auxiliary units

ELECTRIC ARC FURNACES
– Hyundai Steel Danjjin, South Korea; meltshop with electric arc furnace (135 tons), ladle furnace (135 tons), and auxiliary units

SECONDARY METALLURGY
– SDE; Stomana (Sidenor), Bulgaria; vacuum degassing plant (100 tons)

CONTINUOUS CASTING TECHNOLOGY
– Taewoong CO., Korea; three-strand round bloom continuous caster for diameters of up to 1,000 millimeters
– Asil Celik San.ce Tic., Turkey; three-strand round bloom continuous caster
– Jiangsu Shagang inter. Trade, China; six-strand billet continuous caster
– Gunung Garuda, Indonesia; four-strand beam blank continuous caster

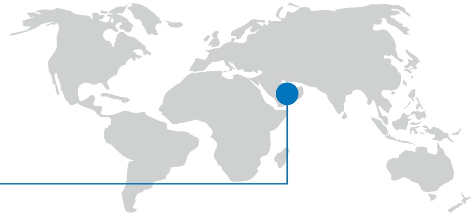
COMMISSIONING PROJECTS

MINIMILLS
– South Steel Company (SOLB), Saudi Arabia; minimill for 1 million tons of billets, 500,000 tons of rebar steel
– Perfiles Comerciales Sigosa (Rio Bravo/Groupo Simec), Mexico; meltshop with 60 tons each EAF, ladle furnace, vacuum degassing plant, and three-strand continuous bloom caster

ELECTRIC ARC FURNACES
– Jiang Lianfeng Energy (Yonggang), China; 110-t EAF

SECONDARY METALLURGY
– Oezkan Demir Celik, Turkey; 100-t vacuum degassing plant
– Ovako, Sweden; dust-collecting system (phase 2)

CONTINUOUS CASTING TECHNOLOGY
– Zhangjiagang Hongfa, China; 1 x 6 continuous caster
– Feng Hsin, Taiwan; modernization of 5-strand caster



Location: Saudi Arabia

SOUTH STEEL COMMISSIONS MINIMILL

Last year, South Steel of Jizan (Saudi Arabia) successfully commissioned a minimill we supplied. The steelworks is capable of producing 1 million tons of billets, and the rolling mill up to 500,000 t of rebar steel per year. Particularly important to our customer is that the new plants meet its high demands for efficiency, flexibility, and productivity.

The electric arc furnace is designed to produce 24 batches per day. A ladle furnace (LF) is used for the secondary metallurgy. The raw material consists of 80% HBI (hot-briquetted iron) and 20% scrap. However, the furnace can also process up to 100% HBI. The electrode control and process automation of the steelworks meet high requirements. Consequently, they ensure a homogeneous process with considerable flexibility and high productivity.

The five-strand continuous caster produces 1 million tons of square billets in the formats 130 millimeters and 150 millimeters. Half of the billets cast are sold on the regional market, the other half are further processed while still hot in the rebar rolling mill.

Fully automated, the rolling mill consists of 16 housingless stands, followed downstream by a finishing block with six stands. Due to the HSD® (High Speed Delivery) systems, the plant can achieve final rolling speeds onto the cooling bed of 41 meters per second. This means high production rates per hour even for small dimensions.



Successful partnership: The continuous caster produces up to one million tons of billets per year – and a second rolling mill has already been ordered.

"We are very happy about the successful cooperation with our customer during this project," says Stefan Rutishauser of SMS Concast. "Thanks to the large capacity of the components, the performance and productivity of the minimill are really impressive, exactly as South Steel expected."

The South Steel minimill represents a major milestone in the establishment of a steel cluster. "Jizan Economic City" is one of six newly built cities designed to make the Saudi economy less dependent on crude oil exports by 2030.

The minimill is a major milestone in the development of the steel cluster "Jizan Economic City".





TUBE AND PIPE PLANTS



- Continued difficult market situation
- PQF® plant for Tenaris
- Declining willingness to invest in welded tube plants
- PWS supplies pipe tester to Salzgitter Mannesmann

2013



Compact, easily accessible design increases user-friendliness

CONTINUED DIFFICULT MARKET SITUATION

Characteristic of the project situation in the tube plants sector in 2013 was a very low willingness to invest. However, the demand for seamless tube plants in the USA continued to pick up. The tube welding plant and spiral tube welding plant sectors suffered from strong competitive pressure for comparatively few projects available on the market.

We successfully launched innovative technologies for cost-saving, greener tube production such as PQSC®mandrels, INCOAT®, CaliView®, and PERFECTarc®.

PQF® PLANT FOR TENARIS

Tenaris has contracted us to supply a PQF® plant to its Bay City location in Texas (USA). The plant in BCO (Bilateral Change Over) design produces seamless tubes with improved tolerances. What Tenaris gains from the new system is the ability to meet the increased demand for precise, high-strength tubes driven for instance by shale gas extraction in the USA.

Special to the PQF® plant for Tenaris is that the stands are changed on both sides of the rolling mill. Furthermore, the compact, easy-access design increases user-friendliness and enables a symmetrical arrangement. That again improves the tube wall thickness tolerance. The drive design is simpler, making it easier to maintain. The plant has an annual capacity of 600,000 tons.

It produces tubes in dimensions of up to 9 ⅝". Because they are used for transporting gas and oil (so-called OCTG tubes), the tubes must meet very high quality and tolerance requirements.

Vallourec Star placed an order with us for a crossroll piercing mill for the multistand pipe mill (MPM) at the company's Youngstown location, Ohio (USA). This is how our customer intends to increase product quality and reduce maintenance costs. Also included in the order scope, apart from the cross-roll piercer, are the electrical equipment and basic automation, plus transport equipment and a billet-end centering unit. We are responsible not only for supervising the assembly and commissioning, but also for training the operating personnel.

DECLINING WILLINGNESS TO INVEST IN TUBE WELDING PLANTS

Corinth Pipeworks of Athens (Greece) has awarded us a contract to supply a JCOE® large-diameter pipe mill for longitudinally welded pipes. Keen to supply the growing global demand for high-strength pipes for oil and gas transport, Corinth is expanding its product range with this investment. The annual capacity of the plant will be 400,000 t.

Soon, the tubes from Corinth Pipeworks will be used for energy supply networks in the Mediterranean region, the Gulf of Mexico, Latin America, West and East Africa, and in the North Sea.

Corinth Pipeworks already operates an HF welded pipe plant and a spiral pipe mill from us. Once it is equipped with the new JCOE® large-diameter pipe mill, the company will own the full range of production technology for pipe welding.

JSC Vyksa Steel Works of Vyksa (Russia) has successfully commissioned a new gap-closing press.

The machine modernizes our customer's large-diameter pipe mill, significantly increasing its productivity.

What makes the gap-closing press so important is that it enables JSC Vyksa to cost-effectively produce tubes of small diameters and high wall thicknesses. These special dimensions are particularly in demand for offshore pipelines.

Now JSC Vyksa is able to produce even these challenging pipe sizes on both JCO® pipe-forming presses with the utmost precision and at maximum machine capacity. Then, with no loss of cycle time, the gap-closing press minimizes the remaining gap in just a few steps, creating the precondition for reliable tack welding.

The gap-closing press features a VSP (Variable Speed Pump). As a result, it consumes up to 50% less energy than the older machine generation. That's how the closing press at Vyksa satisfies the conditions for our "Ecoplants" label.

Another customer to commission a JCO® pipe-forming press from us was SeAH Steel Corporation in Pohang (South Korea). Assembly and installation took just two and a half weeks. As early as 15 months after placing the order, the company was able to produce pipes on the press in Pohang.

PWS SUPPLIES PIPE TESTER TO SALZGITTER MANNESMANN

Salzgitter Mannesmann Line Pipe (SMLP) of Siegen commissioned an HTM (Hydro Testing Machine) pressure tester supplied by PWS. Our customer can use the machine to test up to three pipes of different lengths simultaneously. Compared to conventional technology, this solution saves up to 30% of the time required for each measurement. A bonus for the customer was that the new plant was erected and commissioned without interrupting ongoing production.

MAJOR ORDERS

SEAMLESS TUBE PLANTS

- Tenaris Bay City, USA; PQF® plant
- Vallourec Star Company, USA; cross-roll piercing mill for 10 3/4" MPM plant
- Seversky Tube Works, Russia; thread-cutting machine
- PTC Seamless Tube, USA; 4.5–16" feeder

WELDED TUBE PLANTS

- Arvedi, Brazil; 5" tube welding plant and finishing plants
- Gazpromtrubinvest, Russia; 16" tube welding plant
- Corinth Pipeworks, Greece; JCOE® large-diameter pipe mill
- Huta Labedy, Poland; 12 ¾" tube welding line and API finishing plant
- Prolamsa, USA; finishing plants

COMMISSIONING PROJECTS

SEAMLESS TUBE PLANTS

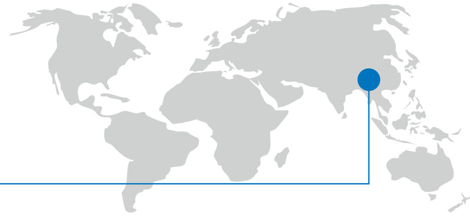
- ArcelorMittal Tubular Products Jubail, Saudi Arabia; 16" PQF® plant
- Bharat Heavy Electricals, India; CPE plant
- Changzhou Changbao, China; CPE plant
- Baoti Group, China; GG 52 roll grinding machine
- Voestalpine Tubular, Austria; tube reeler

WELDED TUBE PLANTS

- Berg Steel Pipe Corporation, USA; 24–62" pipe tester
- Tianjin Pipe International, China; RSA 26"+14"
- JSC Vyksa Steel Works, Russia; GCP® gap-closing press
- SeAH STEEL, South Korea; forming press

SPIRAL PIPE WELDING PLANTS

- Salzgitter Mannesmann, Germany; hydrostatic pipe tester



TPCO

Location: China

20 PQF® PLANTS IN 10 YEARS

There was a special moment at our symposium, attended by 250 customers from 23 countries, when our team ceremoniously handed over the 20th PQF® (Premium Quality Finishing) plant to Chinese company TPCO. This first plant of the PQF®-BCO (Bilateral Change Over) generation will be erected in Texas (USA).

It is now 10 years since the first tube was rolled on this type of plant at TPCO. That shows how close the partnership between our two companies is and how open the Chinese company is to technological innovations.

Already efficient, PQF® has improved yet again with the BCO generation. Now the tube tolerances are even narrower and the changeover times shorter. The result? Increased efficiency and greener production. The BCO solution still features the advantages of its predecessor: The stand expansion is identical in all directions. So there are no deviations in caliber under load caused by stand expansion. The changeover at the sides makes checking the caliber in the rolling mill and changing the mill stands much faster.

With its fifth PQF® plant, TPCO has taken a technology leap. It was important to TPCO to improve quality and efficiency even more – something that's now possible thanks to the new technology.



Dr. Li Quiang, President of TPCO (right) and Norbert Theelen shake hands on the transfer of the 20th PQF® plant.

[1] | Thanks to pre-assembly, PQF® plants go into production quickly and reliably. **[2] |** All plant components are centrally controlled from the control room.





LONG PRODUCTS PLANTS



- Difficult market situation
- Billet mill for Ha Tinh Steel
- Wire rod and bar mills for quality steel
- Increasing success for MEERdrive® and PSM®
- New projects with bright steel plants

2013



Modernizations enable plant operators to expand their product ranges

DIFFICULT MARKET SITUATION

Once again in 2013, the market for long-product plants was under pressure. The number of projects up for bidding declined again. There were in particular no orders for large long-product mills. Demand focused on rebar steel rolling mills as well as semi-finished and bar steel mills for quality grades.

SECTION AND BILLET MILLS

The Formosa Ha Tinh Steel Corp. (Formosa group) placed an order with us to supply a billet mill for quality steel to its facility in Vietnam. Designed as a semi-continuous plant, the mill will initially have a capacity of 1 million tons per year, with the option of later expansion to 2 million tons per year. It will produce 150-millimeters square billets. Compact and rigid SC® mill stands will be used in the mill.

Anshan Iron & Steel (China) contracted us to supply a new reversing stand for its existing rail line. Here, we will also supply the entire automation for the new stand as well as commissioning the plant. Furthermore, we have attracted an order from Stahlwerk Thüringen (Germany) for a revamp of its existing CRS® (Compact Roller Straightener). Our customer aims to straighten larger beams in the future. That requires replacing the stands to create a larger straightening roller gap.

Another revamp has already successfully been wrapped up. It involved upgrading the section mill of Nucor-Yamato Steel (UMCOR) in Arkansas (USA). We also supplied additional mill stands which make it possible to roll wider pile products. The core component of the project is a new 3-stand finishing train which replaces the existing universal finishing stand. All the new finishing stands are in CCS® design and feature hydraulic adjustment, adjustment under load, and fast program changeover in just 20 minutes.

LIGHT SECTION MILLS

We attracted an order from Indian company Jindal Steel & Power for a high-performance rolling mill for rebar steel in sizes from 8 millimeters to 40 millimeters. The rolling mill is designed for an annual capacity of 1.4 million tons. Thin bars are transported onto the cooling bed at a speed of 42 meters per second. This is possible with our high-speed delivery system (HSD®). Also included in the scope of supply is the heating furnace, with a capacity of 245 tons per hour, plus the electrical and automation systems.

Abinsk Electric Steel Works in the Krasnodar region of Russia successfully commissioned an extension of its high-speed rebar rolling mill. Now Abinsk can use the two new roughers to produce larger square blooms than before.

WIRE ROD AND BAR MILLS

Kardemir Iron & Steel (Turkey) contracted us to supply a wire rod and bar mill for quality steel. Designed for a capacity of 750,000 tons per year, the plant features 3 finishing lines: a bar steel line with cooling bed and cut-off machines, a wire mill with winding cooling conveyor and coil transport equipment, and a coiler. The plant is equipped with all modern processes such as thermo-mechanical treatment of bar steel and wire, edge annealing of rebars, and temperature-controlled rolling. Key to the bar steel line is a 3-roll precision sizing mill (PSM®). The wire mill features a 10-stand wire rod block in MEERdrive® technology.

Continuing its success in this area, we will supply two new PSM® precision sizing blocks to China. This is our customers' response to demand for high-quality bar steel products from the emerging automotive industry. Qindao Iron & Steel and Yongang Iron & Steel each placed an order with us for two 5-stand sizing blocks as well as the equipment for thermo-mechanical treatment.

NEW PROJECTS WITH BRIGHT STEEL PLANTS

Outokumpu VDM (Germany) has awarded us a contract for a PMH 320 peeler including finishing lines for its facility in Unna. The peeling machine will be a major component of the newly erected complex for further processing forging rods. Taking this step, Outokumpu is expanding its production capacities for high-quality forged products, especially for the aviation and aerospace industries, as well as the oil and gas market.

What makes the modern peeler system stand out is its high productivity. Furthermore, it replaces several lathes. The maximum chip takeoff can be up to 20 millimeters. The machine peels rod lengths of 2.7 meters to 8 meters. Primarily, the plant will be used to peel nickel-based alloys. There is a special plant constellation that enables peeling in a circle. This means the rods can be pre-peeled, then the finishing line conveying equipment returns them directly for final peeling. A laser measuring system with automatic tool return ensures the high precision of the rotary peeler.

Dongil Industries of Pohang (Korea) has contracted us to replace its existing straightener with a two-roll straightener and polishing machine. The company will use this system in the future to produce bright steel with high-quality surfaces. Its customers can rely on a bar straightness of as precise as 0.35 millimeters per meter, with a surface roughness below 5 µm. What is more, Dongil Industries will increase productivity with the new plant.

The two-roll straightening and polishing machine will be integrated into an existing drawing line dating from 1989. Bright steel manufacturer Dongil will install the drawing line in a plant recently acquired in the port city of Pohang, where it will also be revamped.

MAJOR ORDERS

SECTION AND BILLET MILLS
- Nan Ya Plastics Corporation (Formosa Ha Tinh), Taiwan; semi-continuous billet mill
- Anshan Iron & Steel, China; reversing stand for rail mill
- Stahlwerk Thüringen, Germany; modernization CRS® straightener

LIGHT SECTION MILLS
- Jindal Steel & Power Limited, India; rebar mill

WIRE ROD AND BAR MILLS
- Jiangsu Yonggang Group, China; PSM®
- Kardemir, Turkey; wire rod and bar mill
- Tai Zhing Mei Ji, China; horizontal coil compactor
- Qingdao Iron & Steel, China; PSM®

BRIGHT STEEL
- Outokumpu VDM, Germany; PMH 320 peeling machine
- Dongil Industries, Korea; WRP 40 BF two-roll straightening and polishing machine

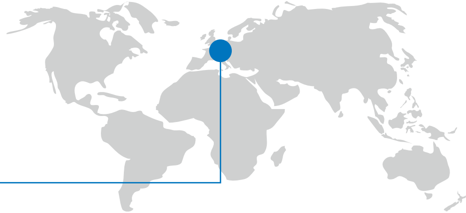
COMMISSIONING PROJECTS

SECTION AND BILLET MILLS
- Umcor (Nucor Yamato), USA; modernization of section mill
- JSC Evraz Consolidated, Russia; rail mill

LIGHT SECTION MILLS
- Nucor Connecticut, USA; stands and coil-handling equipment
- Abinsk, Russia; two roughers
- Kaluga, Russia; light section mill

WIRE ROD AND BAR MILLS
- The Timken Company, USA; MEERgauge®
- Steel Dynamics (SDI), USA; roughing mill

BRIGHT STEEL
- SeAH Special Steel Co., Croatia; KZ-RP 3B drawing machine
- Ziehwerk Plettenberg, Germany; BC 50 bright steel center



ARCELORMITTAL

Location: Germany

MEERDRIVE®-DRIVE UNIT AT ARCELORMITTAL IN DUISBURG-RUHRORT

The new wire mill at ArcelorMittal in Duisburg-Ruhrort is the first wire rod mill to be erected in Germany for decades. Simultaneously, it is one of the world's most modern and energy-efficient. The heart of the mill is formed by the 6- and 4-stand wire rod blocks driven by MEERdrive® technology. Compared to conventional group drive technology, this individual solution achieves a much higher flexibility during the rolling process. The new rolling mill is designed for an annual capacity of 690,000 tons. It produces complex steel grades from low- to high-carbon steels, cold upsetting steels, machining steels, alloyed steels, spring steels, ball-bearing steels, stainless steels, and tool steels, as well as welding wire. The plant configuration is designed especially for thermo-mechanical rolling of high-quality steels. The typical production dimensions are from 5.5 to 25 millimeters in diameter. Rolling speeds of up to 120 millimeters per second are possible.

6+4 wire block arrangement for thermo-mechanical rolling. At ArcelorMittal Ruhrort, all dimensions are finish-rolled in a 4-stand wire block. Thanks to sufficient intermediate cooling between the wire rod blocks, this allows for thermo-mechanical treatment in the line.



ArcelorMittal can adjust the product quality exactly to customer requirements.

[1] | The key to flexibility and energy efficiency: one motor per stand. **[2] |** The entire rolling mill operates at high speed.





FORGING PLANTS



- Continued stable market situation
- Innovative solutions for hydraulic presses
- Extrusion presses successful
- New closed-die forging machine projects
- Ring and wheel rolling machines in demand

2013



CONTINUED STABLE MARKET SITUATION

Once again, in 2013 the Forging Technology Division benefited from a stable market situation. Many customers chose us as their preferred partner for hydraulic presses, extrusion presses, ring and wheel rolling machines, and closed-die forging plants.

INNOVATIVE SOLUTIONS FOR HYDRAULIC PRESSES

Newly developed at SMS Meer is the SMI 430/8-MN hydraulic horizontal forging machine. The plant is used to pre-shape parts that subsequently go into a closed die to receive their intermediate or final form. It comes with shorter setup times and improved productivity.

Included in the special features of the horizontal forging machine is the integrated die shifting device. As a result, a second die form can be used quickly within a single forging operation. The advantage for the customer: minimized setup times and increased output.

The first machine of this type went into production at a Japanese company in 2013. It is equipped with two forging manipulators as well as a further manipulator for fully automated loading and unloading.

EXTRUSION PRESSES SUCCESSFUL

Short downtimes and high productivity with better hydraulics

Sapa Profiles of Székesfehérvár (Hungary) has placed an order with us for a 32/35-MN short-stroke front-loading press. Thanks to improved hydraulics, the plant offers short downtimes and a high level of productivity. Impressive features of this energy-efficient and fully automated front-loading press include a compact, stable press frame and short cylinder strokes. The energy-efficient design of the hydraulic drive unit reduces production costs.

That's because a newly developed system deactivates unnecessary drives. As a result, Sapa Profiles saves a great deal of energy compared to the consumption levels of older presses.

Aluminium Laufen of Liesberg (Switzerland) has awarded us an order for a 32/35-MN short-stroke front-loading press. This new plant will expand the company's manufacturing scope for aluminum round material and extruded profiles. Particularly worth mentioning are the precision guides of the container and extrusion stem, the efficient hydraulic power packs, and the movable shear for optimized cutting of pressing waste. All this will be integrated into the existing automation landscape.

Another customer convinced by our plants is the Indalum Group, based in Santiago de Chile (Chile). It also ordered a short-stroke front-loading extrusion press from us with a press force of 32/35 MN.

The company will be able to expand its product range with the energy-efficient lightweight metal extrusion press.

To achieve the required productivity, the press will additionally feature the CADEX optimization software for isobar and isothermal extrusion pressing.

NEW CLOSED-DIE FORGING ORDERS

Bharat Forge Aluminiumtechnik (Germany) contracted us to supply an ARWS 2 forging roll and an MP4000 closed-die forging press. Also in 2013, Liaoyuan Fangda Forging Co. Ltd. (China) ordered the world's largest wedge press.

WHB Fundicao (Brazil) commissioned a new eccentric forging press in 2013. Working for German company Schöneweiss & Co., we successfully completed a revamp of the VEPES 4000. Hirschvogel also chose us for its MP/AMP 3150 at locations in Germany and China.

RING AND WHEEL ROLLING MACHINES IN DEMAND

Euskal Forging of Sestao (Spain) has ordered its fifth ring rolling machine from us. The new machine will be the second most powerful ring rolling machine we have ever built. Once it has its new radial-axial ring rolling plant up and running, the Spanish company will be able to expand its production range to rings weighing up to 50 tons with a maximum diameter of 10 meters and a maximum ring height of 1,700 millimeters.

Included in the package is modern auxiliary equipment for efficient, cost-effective manufacturing of parts such as tower flanges in the form of profile rings for wind turbines. This is how the Spanish company will meet market demand for ever larger rings to be used in tower flanges. These are needed particularly in offshore applications where higher wind turbine towers are fitted with larger generators for yields of up to 7.5 MW.

MAJOR ORDERS

EXTRUSION PRESSES
- S.C. Vimetco Extrusion, Romania; 32/35-MN extrusion press
- Sapa Profiles, Hungary; 32/35-MN extrusion press
- Cansan Alüminyum, Turkey; 32/35-MN extrusion press
- Shandong Innovation Metal, China; 28-MN indirect tube press
- Aluminium Laufen, Switzerland; 32/35-MN extrusion press
- Indalum, Chile; 32/35-MN extrusion press

CLOSED-DIE FORGING MACHINES
- Bharat Forge Aluminiumtechnik, Germany; ARWS 2 forging roll and MP4000 closed-die forging press
- Liaoyuan Fangda Forging Co. Ltd., China; KP 16000 forging press
- Ahmednagar Forgings, India; KP 1250 closed-die forging press

RING AND WHEEL ROLLING MACHINES
- OAO VSMPO – AVISMA, Russia; RiWa 8000/400/1350/500
- ZVU Kovárna, Czech Republic; RAW 125(160)/100(125) EM
- Zollern, Germany; RAW 63/50 EM
- Euskal Forging, Spain; RAW 1000(1250)/1000(1250)

COMMISSIONING PROJECTS

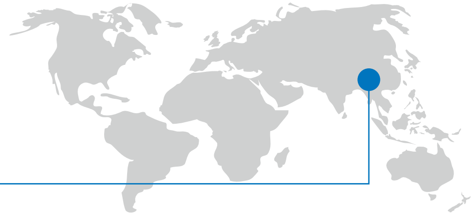
HYDRAULIC PRESSES
- Sinochem Intern. Tend., China; forging press
- Sinochem Intern. Tend., China; SMX800 forging machine
- Dongbei Special Steel, China; 80/100-MN open-die forging press

EXTRUSION PRESSES
- Jilin Liyuan Aluminium Co., China; 45-MN extrusion press
- Jilin Liyuan Aluminium Co.; China; 100-MN extrusion press
- Constellium Singen, Germany; 40/44-MN extrusion press
- Nanshan America Advanced, USA; 82-MN extrusion press

CLOSED-DIE FORGING MACHINES
- WHB Fundicao, Brazil; eccentric forging press
- Schöneweiss & Co., Germany; revamp of VEPES 4000
- Hirschvogel, Germany and China; MP/AMP 3150
- Shaanxi Fast, China; AMP 5000

RING AND WHEEL ROLLING MACHINES
- Ovako Tube and Ring, Sweden; RAW 200(250)/160(200)
- Taiyuan Heavy Ind., China; ERWA 5000/10000/1250/5000
- Liberty Forge, USA; RAW 160(200)/160(200)
- TIMKEN Romania, Romania; el. mod. RAW 100/80

TAIYUAN HEAVY INDUSTRY RAILWAY TRANSIT EQUIPMENT



Location: China

TAIYUAN HEAVY SUCCESSFULLY COMMISSIONS WHEEL ROLLING MACHINE

Taiyuan Heavy Industry Railway Transit Equipment of Taiyuan in Shanxi Province (China) successfully commissioned a wheel rolling machine supplied by SMS Meer. The new plant forges up to 350,000 high-quality railway wheels per year. This is how the company is able to meet the increasing demand for high-quality and high-speed wheels in the People's Republic of China.

Included in the supply package were the descaling unit, two wheel blank presses with 50 and 100 MN press force, one wheel rolling machine, and the dishing and piercing press. Additionally, we supplied a wheel marking unit and a contactless 3D laser measuring machine as well as six manipulators for the wheel rolling machine.

Ren XueYi, Vice President of Taiyuan Heavy, said: "SMS Meer has supplied an internationally top-class rolling and forging line. With the support of their team and their conscientious efforts, and after two years of work, the world's most advanced and intelligent rolling and forging line for high-speed wheels is now in operation."



Modern technology ensures consistent high quality.

All the processes within the plant run fully automatically and in parallel. The 15 CNC-controlled axes of the web rolls, pressure roll, and side rolls roll and guide the wheel blank – without a mandrel. Possible wheel tread diameters range from 700 to 1,250 millimeters.

[1] | All processes run fully automatically. **[2] |** Everything under control: the employees of Taiyuan Heavy in the control room.





NF METALS PLANTS



- Aluminum and copper plants: uneven market development
- Stable demand in the aluminum industry
- High copper price brakes demand

2013



Remelting and casting clean process scrap

ALUMINUM AND COPPER PLANTS: UNEVEN MARKET DEVELOPMENT

Whereas global demand for aluminum plants remained stable, the high copper price made customers in this industry reluctant to invest.

STABLE DEMAND IN THE ALUMINUM INDUSTRY

The remelt plant ordered from Hertwich Engineering by US company Service Center Metals (SCM) of Virginia (USA) is particularly eco-friendly. Compact in design, the remelt plant (CTRP) gives SCM increased flexibility while also saving costs because it can remelt both in-house and external recycling scrap. The scope of supply comprises a stationary multi-chamber melting and casting furnace, two horizontal casting machines with flying saw, and a continuous homogenization plant. The annual capacity of the compact-type remelt plant is 30,000 tons.

Following assembly and commissioning, we handed over the first expansion phase of a homogenizing and sawing line as scheduled to aluminum producer Rio Tinto Alcan in Hafnarfjörður (Iceland). When production switches between standard and special alloys with different holding times, a special furnace design ensures high flexibility and throughput. The highlight of the plant: for the first time, a robot is used to charge the strapping machine with wooden planks.

Aluminium d.d. Mostar of Mostar (Bosnia-Herzegovina) has successfully commissioned the ingot casting line we supplied. Now the company can remelt and cast not only electrolysis metal, but also clean process scrap. Equally important, the new plant increases the flexibility and production capacity of the casthouse. Air cooling ensures very good metal quality in terms of hydrogen content. Now our customer can also efficiently cast high-silicon and other eutectic and hypereutectic alloys.

AMAG (Austria) has commissioned a tiltable smelting and casting furnace from us. Joining forces, the two companies developed the SGO-70+ type furnace together. It has a capacity of 70 tons, and the nominal melting rate is designed for up to 12 tons per hour.

That makes it by far the largest combined smelting and casting furnace we have supplied to date.

The furnace comes with oxygen measurement as well as separate natural gas and combustion air regulation. The result is clean combustion and compliance with strict emission requirements.

Alumetal of Nova Sol (Poland) has commissioned a URTF 14 rotary tilting-type furnace and a water-cooled belt-type ingot caster from us. The second production line enables Alumetal to double its capacity to 66,000 tons per year. This is already the second ingot casting line put into operation by Alumetal. It illustrates how much the customer trusts our technology and expertise.

HIGH COPPER PRICE BRAKES DEMAND

Anhui Tianda Copper in Chuzhou, Provinz Anhui (China) has placed an order with SMS Meer for a CONTIROD® plant. It will produce ETP copper wire rod as a semifinished product for the manufacture of electrical conductors.

The melting furnace is equipped with a lambda control system for the burner and improved cathode distribution.

Minimized natural gas consumption and increased productivity

This minimizes natural gas consumption and increases the product quality. The casting machine offers a large casting cross-section of 5,400 square meters up to with a symmetrical casting microstructure.

KGHM Polska Miedz in Legnica (Poland) contracted us to completely overhaul and modernize its vertical continuous caster for copper billets.

Newly developed by us, the ProConTube® system was first successfully tested at a customer in Northern Italy. Now it has been ordered for the first time for the revamp of a copper tube production plant. Using inline wall thickness measuring, the tube can be guided during throughput so that an eccentricity improvement of up to 2% is achieved in the downstream drawing process. This represents a significant savings potential for manufacturers, especially with today's high copper prices.

A horizontal brass billet caster was successfully commissioned at Mexican company Nacional de Cobre. Complete with a pressure-controlled casting furnace, this plant can produce up to 45,000 tons per year of top-quality extrusion billets for further processing in an extrusion press. The scope of supply covered the primary cooler with automatic water distribution, the drawing unit with PLC-controlled drawing cycle, and a flying saw for cutting the billets to lengths suitable for the press. The new caster replaces the customer's outdated mold caster, eliminating fluctuating billet quality while also expanding capacity.

MAJOR ORDERS

ALUMINUM PLANTS

- Service Center Metals LLC, USA; compact-type remelt plant
- AMAG Casting, Austria; 2 chamber homogenization plants with bar manipulation
- Audi AG, Germany; 2 Ecomelt-PR50 multi-chamber melting furnaces
- Volkswagen AG, Germany; Ecomelt-PR70 multi-chamber melting furnace
- Reynolds Consumer Products Company, USA; Ecomelt-PS140 multi-chamber melting furnace
- Purso Oy, Finland; continuous homogenization plant, ultrasonic testing station, saw
- Tianjin Zhongwang Aluminium, China; 3 bar milling machines, type 3100
- Kumz, Russia; 12-MN and 120-MN plate stretchers, brushing and welding line
- Nanshan, China; 82-MN plate stretcher
- Shandong Nanshan, China; 80-MN plate stretcher

COPPER PLANTS

- Anhui Tianda Copper, China; CONTIROD® CR 3500
- KGHM, Poland; modernization of the vertical continuous caster for copper billets
- Kunshan Deli Copper, China; CONTIROD® plant

COMMISSIONING PROJECTS

ALUMINUM PLANTS

- Rio Tinto Alcan, Iceland; first extension phase of a homogenizing and sawing line
- Aluminij d.d. Mostar, Bosnia-Herzegovina; ingot casting line
- AMAG Casting, Austria; SGO-70+ smelting and casting furnace
- Alumetal, Poland; rotary tilting-type furnace and water-cooled belt-type ingot casting line
- IMPOL, Slovenia; Ecomelt-PS120 multi-chamber smelting furnace
- Audi, Germany; 2 Ecomelt-PR50 multi-chamber smelting furnaces
- Aleris Aluminium, China; plate stretcher and billet chamfering machine

COPPER PLANTS

- Wieland-Werke, Germany; KZ-R 0B drawing machine
- Termomecanica, Brazil; planetary rolling mill
- Nacional de Cobre, Mexico; stationary sawing and casting plant
- Tongling Nonferrous Metals Group, China; CONTIROD® CR 3500

CONTIROD® REDUCES CARBON EMISSIONS

Practice-proven for over 40 years, the CONTIROD® process for continuous casting and rolling of copper wire rods just got even better. How? SMS Meer has succeeded in vastly improving its energy efficiency.

There have been many innovations for the entire process line over the 40-year history of Contirod®. Included among them are a new charging device, an optimized shaft furnace control system, frequency-controlled drive units for combustion air fans, and individually driven, frequency-controlled drives for mill stands. Today's state-of-the-art Contirod® process is the culmination of these constant improvements. It makes the energy-efficient production of top-quality rolled wire a reality.



Our employees support customers on site.

The goal here is to reduce energy and fuel consumption, thereby helping cut carbon emissions from copper processing. Due to the improved design of the charging device, raw material is introduced into the shaft furnace more efficiently and distributed more evenly. The result is better heat transfer in the shaft furnace, leading to increased thermal efficiency.

And there is more, because the shaft furnace design has been further developed with an extra shaft height which extends the dwell time of the raw material in the furnace. That improves the heat exchange between the combustion gases and the charge. Based on an analysis of the combustion gas, the control of the gas-air mix for each burner and the automatic regulation of the gas mix lead to efficient fuel burning and therefore good utilization of the calorific value.

Separate fans for the individual burner rows and speed-variable drives for all air fans and mill stands reduce the energy consumption for the production of copper wire. Assuming a global copper wire production volume of 14 million tons per year, these changes would result in a reduction in CO_2 emissions from copper wire production by around one million tons per year.

[1] | Modern technology cuts energy consumption. [2] | The copper wire is rolled in a closed system.





HEAT TREATMENT TECHNOLOGY



- Heat treatment technology still booming
- Induction hardening plants for the automotive industry
- Increased demand for induction heating plants
- Induction tempering plants boosted by fracking
- Reheating furnaces for a wide variety of applications

2013



Complete processing of gear racks for modern electric steering systems with EloShaft™

HEAT TREATMENT TECHNOLOGY STILL BOOMING

Last year, the market for heat treatment technology continued to expand. Especially the automotive industry showed a strong demand for our products. Consequently, the company was able to increase order intake. However, the market for conventional furnaces failed to sustain its growth.

INDUCTION HARDENING PLANTS FOR THE AUTOMOTIVE INDUSTRY

There was a strong demand from the global automotive industry in 2013 for SMS Elotherm induction hardening plants.

The company signed a long-term framework contract with General Motors. GM ordered machines for its plants in Mexico, the USA, China, Korea, and Hungary. Volkswagen is upgrading above all its Chinese facilities with EloCrank™ hardening plants.

The response was also positive to our newly developed EloShaft™ technology for complete processing of gear racks for modern electric steering systems. For instance, ZF Lenksysteme has now started equipping all its plants for APA (parallel-axle drive) production. We specifically designed our EloShaft™ hardening cell to meet this demand with an ideal solution.

INCREASED DEMAND FOR INDUCTION HEATING PLANTS

We secured a strong position in 2013 above all on the forging markets in Europe, North America, and Korea. Demand for energy-efficient solutions has increased worldwide. Looking at Germany for instance, environment legislation means our customers gain considerable financial advantages when they use energy-saving technology. Our iZone™ for throughput-dependent energy supply to modern forging reheating lines is an ideal solution. And also global operators such as ThyssenKrupp in the USA, Iljin in Korea, or Omnia in Slovakia have profited from our innovations.

When it comes to extrusion presses, we can now, since our takeover of I.A.S., offer an even wider range of attractive technologies such as aluminum billet heating. Companies such as Aluminium Laufen and Wilhelm Schulz rely on Tem-Pro® heater technology to generate exact temperature profiles in aluminum billets.

INDUCTION TEMPERING PLANTS BOOSTED BY FRACKING

There is currently overproportional growth in the area of quench & temper lines for tubes and bar steel. For instance, Evraz and Benteler are investing in heat treatment lines in their North American plants. The objective is to meet the large demand for modern solutions in the area of shale gas and oil extraction (fracking).

REHEATING FURNACES FOR A WIDE VARIETY OF APPLICATIONS

SMS Meer attracted several orders for reheating furnaces in 2013. They cover conventional application fields as well as new areas. Significant in the traditional sector of reheating furnaces for long products was above all our successful commissioning of a new 150 tons per hour walking-beam furnace for ingots for the NLMK Group (Russia).

Furthermore, we were able to secure projects for reheating forged products and bars.

Working for the Toscelik Group (Montenegro), we installed a rotary-hearth furnace with a capacity of up to 12 tons per hour.

We are also supplied a walking-beam furnace to EPSSN (Venezuela). This is part of a Steckel plate mill realized in cooperation with SMS Siemag.

Moreover, in 2013 we started the revamp of a walking-beam furnace with a capacity of 200 tons per hour at Onesteel Whyalla (Australia).

Our company continues to grow in the area of thermal technology for tubes. Take for instance an order from AXIS Prolamsa (USA) for a reheating line for welded tubes. The integrated solution comprises not only the hardening and tempering plants, but also the automation and process technology.

MAJOR ORDERS

INDUCTION HARDENING PLANTS

– BMW (UK, China);
  four EloCrank™ plants for hardening crankshafts
– General Motors, USA, China, Germany;
  six EloCrank™ plants for hardening crankshafts
– ZF Lenksysteme, China and Germany;
  three EloShaft™ plants for hardening steering rods

INDUCTION HEATING PLANTS

– ThyssenKrupp (USA);
  EloForge™ plant for reheating crankshaft blanks
– Tung Ho (Taiwan);
  EloHeat™ plant for reheating ingots and slabs
– Aluminium Laufen, Germany;
  ExtruLine™ for reheating aluminum billets

INDUCTION TEMPERING PLANTS

– Benteler, USA; TemperLine™ for tempering tubes
– EVRAZ, Canada; TemperLine™ for austenitization of tubes

REHEATING FURNACES

– Toscelik Niksic Alloyed Engineering Steel d.o.o., Republic of Montenegro; 12 tons per hour rotary-hearth furnace for forged products reheating
– Kardemir Karabük Demir Çelik Sanayi ve Ticaret A.S., Turkey; 150 tons per hour walking-beam reheating furnace for 700,000 tons per year bar and wire rod mill
– OneSteel Manufacturing Pty Ltd., Australia; revamping of a 200 tons per hour walking-beam furnace for blooms
– EPSSN Works, Venezuela;
  220/280 tons per hour walking-beam furnace for slabs, in conjunction with Steckel plate mill
– Axis Pipe & Tube Inc., Prolamsa, USA;
  heat treatment line for welded pipes

COMMISSIONING PROJECTS

INDUCTION HARDENING PLANTS

– Volkswagen, China;
  three EloCrank™ plants for hardening crankshafts
– Volkswagen, Germany;
  EloShaft™ plant for hardening geared rods
– Ellwood National Crankshaft, USA;
  EloCrank™ XL for hardening large crankshafts

INDUCTION HEATING PLANTS

– WHB, Brazil; EloForge™ plant for reheating blocks
– Ovako, Sweden; EloBar™ for reheating bar steel
– Volkswagen, Germany; EloBar™ for reheating bar steel
– Husteel, South Korea;
  EloSeam™ plant for seam annealing ERW tubes

INDUCTION TEMPERING PLANTS

– Dongbei Tricontrol, China;
  TemperLine™ for tempering bar steel

REHEATING FURNACES

– Pacific Steel Projects, Inc., Tlaxcala Plant, Mexico;
  40 tons per hour walking-beam reheating furnace
– Nucor Steel Connecticut, USA;
  60 tons per hour pusher-type reheating furnace
– Nucor Yamato Blytheville, AR, USA;
  charging/discharging equipment for beam blanks and blocks
– CJSC "KSIEMP", Kaluga, Russia; 150 tons per hour walking-beam furnace for billets in conjunction with the rebar and merchant bar rolling mill plant
– NLMK group, Russia;
  150 tons per hour billet walking-beam furnace



BENTELER PLACES ORDER FOR QUENCH & TEMPER PLANT

As part of the equipment for its seamless pipe work in Shreveport, Louisiana (USA), Benteler Steel/Tube of Salzburg (Austria) ordered a TemperLine™ plant from us. Building the new plant will strengthen the company's presence on one of the most important growth markets in global oil and gas extraction from shale (fracking).

The quench & temper plant consists of the inductive austenitizing and equalizing sections, the quenching station, and the associated transport roller tables and cooling beds.

To generate the working frequency and power of the plant, we use the converter technology (IGBT) developed and built in-house. This makes it possible to work all pipe diameters from around 40 millimeters to almost 140 millimeters in various wall thicknesses at a throughput rate of up to 15 tons per hour. The centerpiece of the TemperLine™ is formed by the flexible multi-zone converters of Elomat® type with a total installed power of 10 MW. Just three converters control eight zones of the austenitizing and annealing section individually, guaranteeing optimal process results.

"With this line configuration, Benteler can achieve metallurgical and geometric qualities that are much better than the requirements of the applicable API standard," says Dr. Guido Opezzo of our Sales team.



The plant at Benteler can produce up to 15 tons per hour.

Furthermore, Benteler does not have to invest in straightening and sizing presses because after heat treatment in the TemperLine™ the straightness and ovality of the pipes do not require any further correction.

SMS Elotherm will supply a TemperLine™ to Benteler Steel.



SERVICE



- Stable order intake
- MEERcare® services on the plant
- Warehousing for ArcelorMittal
- Modernizations in demand
- From experts for experts: training with MEERcoach®
- Training for hydraulic control technology
- Better advised with MEERconsult®



Warehousing: all spare parts constantly available – at low investment cost

STABLE ORDER INTAKE

The order intake by our Service area remained stable in 2013. This reflects our customers' appreciation of the fact that our MEERcare®, MEERcoach®, and MEER-consult® packages offer them holistic solutions for plant, personnel, and processes.

There was a continuation of the trend toward long-standing contractual relationships and partnerships in 2013. Currently, many plant operators want tailor-made services over the long-term, preferably provided flexibly and locally.

Aware of this demand, we are systematically expanding the networks between its service companies and locations to ensure uniform quality standards worldwide. Our specialists not only support customers with their expertise and years of experience, but also explain product developments and innovations.

MEERCARE® SERVICES ON THE PLANT

Included in the MEERcare® service line are for instance spare parts, maintenance work, modernizations, and rapid-response repairs.

To ensure production is not interrupted, the right spare parts must always be available. However, customers want to avoid tied-up capital and high storage costs. This is where we offer the ideal solution. We take over the entire warehousing, as we have for instance on behalf of ArcelorMittal in Duisburg-Ruhrort (Germany) or Sulb in Bahrain.

WAREHOUSING FOR ARCELORMITTAL

We operate a consignment warehouse for ArcelorMittal in Duisburg-Ruhrort with over 600 units. That requires intelligent planning and logistics. Working together with a global logistics partner, our experts manage this warehouse located close to the customer's production facility. ArcelorMittal only pays after receiving parts. A significant liquidity advantage.

The spare parts are delivered within one day, and if necessary urgent deliveries can be made within 90 minutes. Even at the weekend, when most planned maintenance work is carried out, all parts are available.

Our experts take care of constant availability of all the agreed parts as well as automatic restocking. So ArcelorMittal can focus on its core business rather than getting sidetracked with logistics and warehouse management. This was the crucial factor in the decision to choose our company as its service partner: ArcelorMittal saves time and money.

MODERNIZATIONS IN DEMAND

Customers all over the globe benefited from customized modernization solutions like these in 2013. Contracted for instance by Chinese plant operator Dongbei Special Steel, we carried out a general overhaul of three peeling machines dating from 1988. Then we disassembled them in the workshop in Dalian, Liaoning Province, and re-erected them in the customer's new facility outside the city center. Now the plants achieve better surface quality and closer diameter tolerances.

When it comes to value-added components, we offer our customers various technology modules they can use to optimize their plants at low cost and effort. These include for instance special roller bearings for wire rod blocks.

There are certain essential requirements for roller bearings in wire rod lines. Especially in the mill stands of the finishing block, extremely high speeds and rolling torques occur, which must be supported by the bearings.

Our roller bearings are manufactured to high precision and designed to balance out the axial and radial stresses. As a result, they not only avoid downtimes, but also ensure the high quality of their rolled products.

FROM EXPERTS FOR EXPERTS: TRAINING WITH MEERCOACH®

Our employees share their know-how with customers. Our MEERcoach® service line is all about people. Whether assessments, standard instruction, individual training, or e-learning: Wherever customers want to systematically develop their employees' skills or need help with production, they can benefit from our training and coaching programs. The MEERcoach® experts apply proven training methods. There is always a firm focus on practical application.

And customers choose the areas they want to be tackled. Based on this information, our experts draw up a tailor-made training program.

Employees from ArcelorMittal Hamburg spent two days in our workshop learning in a customized training program how to work effectively with CL 200 rolling modules.

Other tailor-made courses have taken place on-site in customers' premises. Gerdau Ameristeel (USA) called us in for a straightener training course. During the three-day event, MEERcoach® experts taught basic knowledge about the straightening process and the ways specific machine components work.

There is also an increasing demand for standard training programs. Customers can choose from a range of courses on fixed dates dealing with selected subjects concerning servicing/maintenance and plant technology.



TRAINING FOR HYDRAULIC CONTROL TECHNOLOGY

This course conveys advanced knowledge about machine and control technology that enables participants to carry out maintenance and troubleshooting in a systematic way.

BETTER ADVISED WITH MEERCONSULT®

The third service line covers technology and processes. Here, our specialists examine for instance in feasibility studies whether a final product can be manufactured in the way the plant operator envisages. Equally useful, a customized maintenance strategy can minimize downtimes and maintenance costs. Whenever necessary, technical assistance is provided on-site at the customers' plant.

German company Schöneweiss contracted us to identify improvement potentials and optimize processes. These were the objectives of the fact-finding audit in Hagen. Three service specialists were on site to optimize the servicing/maintenance organization together with Schöneweiss. It took them just three days to draw up an in-depth analysis as the basis for a comprehensive maintenance strategy. The results of the investigations in Hagen: we will optimize the computer-aided maintenance management system (CMMS).

ELEXIS AG



- Stable growth due to diversification
- Technology and market leadership in many industries
- Targeted response to specific global demand
- New solution for furnace control in strip finishing lines

2013



Broad diversification enables elexis to better compensate for industry-related downturns, reducing its susceptibility to economic fluctuation

The elexis business model is built on the pillars technology leadership, market leadership, cost leadership, and diversification. It is the combination of these four strategic objectives that makes elexis AG a successful and profitable company.

Due to its innovative developments, elexis sets the technological benchmark in a whole range of sectors. What puts the company ahead in many niche markets apart from this innovation drive is above all more process reliability, high quality, and a focus on what customers really require. Companies around the world appreciate elexis not only as a supplier, but also as a partner for genuine solutions that increase productivity, efficiency, and quality.

Yet it is these products' applicability to a wide range of segments that secures elexis AG sustainable success. Metals processing, drive technology, packaging printing, non-woven fabrics, converting, tires, consumer goods, medical technology, automotive: products from elexis are used in all these areas.

PROSPECTS: THRESHOLD ECONOMIES CONTINUE TO DRIVE THE GLOBAL ECONOMY

Globally, economic activity has reached a stable but low plateau. Nevertheless, economic development remains unpredictable. Even though the recession in the eurozone is considered over, these economies can still be unsettled by continuing uncertainties on the financial markets. The US economy is now stable due to fiscal policies such as the increased debt ceiling and expansionary monetary policy.

Once again, the engine of growth next year will be the emerging economies, above all China. There is a slight slowdown here. However, the desire for a higher standard of living and consumption in these countries remains undimmed in the medium term and will continue to fuel stable demand.

Yet it will not be possible to escape the effects of certain industry-specific developments in the coming years. The metalworking industry will be affected again in 2014 by overcapacities and consolidation trends on the market. Conversely, a long-term increase in sales can be expected in consumption-related industries such as packaging printing, converting and non-woven fabrics, medical technology, and consumer goods.

TARGETED RESPONSE TO SPECIFIC GLOBAL DEMAND

The products of elexis AG are designed to meet the demand situation on global markets.

The focus in the industrialized countries is on innovation, efficiency improvement, and resource-saving.

That's in contrast to the emerging economies, which are mainly striving to achieve existing western standards. The response of the elexis group to this diverse international demand structure is a broad product range consisting of proven technologies and innovative systems.

Similarly, the production, sales, and services of elexis AG are structured according to regional demand.

Apart from its locations in Germany, elexis runs its own production facilities and sales branches in Brazil, China, India, Japan, and the USA.

Local access to customers leads to better understanding of their needs and communication in their own language

This combination of global presence and local networks gives elexis the edge over competitors, secures lasting customer satisfaction, and is a crucial foundation for sustainable profit and growth.

PRODUCT INNOVATIONS: MILESTONES IN 2013

As an engineering company, elexis continually works on optimizing existing technologies, opening up new application fields, and developing innovative solutions to meet customers' requirements, always true to its motto "Our vision for perfect automation". Once again in 2013, its two Divisions – High Quality Automation and High Precision Automation – achieved new successes.

EMG-VIVALDI® – A PARADIGM CHANGE IN FURNACE CONTROL

"I spy with my little eye" is a much-loved children's game. Yet the desire to see through walls is not just a dream for children, but a challenge for every engineer. During the production of cold strip, the material is annealed in annealing or galvanizing lines, with temperatures in the furnaces reaching 1,000 degrees Celsius and beyond. Thin steel strip (> 0.1 millimeter) travels through gas-tight furnaces at a rate of 100 meters per minute. It is vital for exact control of the plant to measure the position of this strip with a precision down to the millimeter. This is a tough challenge which could previously only be accomplished using special sensor systems.

The problem here is that these sensors are located inside the furnace and are therefore exposed to the enormous heat. That not only makes them very susceptible to wear, but also means they may require sophisticated cooling, and at worst they can be destroyed by uncontrolled strip movements.

The developers of the EMG set out to solve this problem. Their goal was to detect the course of- the strip not from inside the furnace, but from the outside.

But how can you look through a furnace wall, especially when optical technologies are no use because of the ambient conditions and temperatures?

The solution: If it is not possible to measure light wavelengths, other wavelengths must be used instead. The result: Working with electromagnetic waves, EMG-Vivaldi® precisely measures the strip center from outside the furnace wall.





Now users in the steel industry can measure and control even hot strip production much more cheaply, reliably, and with low maintenance effort

Unlike other, radar-based measuring systems, EMG-Vivaldi® builds on the principle of so-called Vivaldi antenna technology. More exactly, the EMG-Vivaldi® system consists of pairs of flat antennas with ultra-broadband characteristics which are placed on the opposing side walls. One antenna serves as the transmitter, the other as the receiver. The waves are reflected by the strip edges, then the data on the edge position is transferred to the signal analysis system using optimized digital runtime measurement (via direct signal measuring).

The first system is up and running at California Steel Industries Inc. (CSI), 50 miles east of Los Angeles. While optimizing the process stability of its hot-dip galvanizing line #2, the customer also decided to replace the camera-based strip position control system. The measuring system is located in the cooling area of the furnace shortly before the exit into the zinc bath. CSI was looking for a low-maintenance strip position control system for the annealing furnace which could be integrated into the furnace architecture as easily as possible. EMG-Vivaldi® ultra-broadband radar measurement fitted the bill exactly.

PRODUCT INNOVATIONS AT THE "K 2013"

The "K" is the world's most important trade show for the plastics and rubber industry. It takes place every three years in Düsseldorf. In October 2013, it attracted 218,000 trade visitors from 140 countries keen to find out about new trends, technologies, and innovations. Among the 3,200 exhibitors were the elexis companies BST International, BST ProControl, AccuWeb, and HEKUMA. The four companies presented their entire product ranges.

Two of the trade show highlights were QCenter from BST, a new platform type for holistic quality assurance in printing, and a state-of-the-art system from HEKUMA for producing needle holders used in insulin pens.

QCenter is an innovative product line for central control of a number of QA functions. Modular in design, the machine is the very first to integrate track observation, 100-percent inspection, and other applications in one user-friendly system. Because of consistent controls throughout, users can now perform the vast range of QA tasks quickly, clearly, reliably, and after minimum training.

The new HEKUMA handling system for needle holders in insulin pens was presented together with the partners ENGEL Austria and toolmaker Braunform. The unit is groundbreaking in terms of manufacturing speed and precision for these products used in the medical technology industry. Diabetics who inject insulin need several of these single-use products every day. Considering the fact that around six million diabetics live in Germany, that adds up to an annual consumption of billions just in this country.

There is a simple formula that applies here: the more units produced per unit of time, the cheaper the production. However, the condition for this is consistently high and reliable quality. Now the system from elexis increases production speed by up to 20% – and simultaneously increases the quality as well as the efficiency of the entire process.

EMPLOYEES
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- Uniform, internationally applied human resources management
- Focus on supporting fresh talent
- Tailor-made offers for the continuous qualification of our employees
- Work-life balance: career and family do go together

2013



We cooperate with universities and create ties with promising students at an early stage by offering scholarships, internships, and assistance with study assignments in our company

The SMS group is a group of companies with the character of a medium-sized enterprise. It is owned by the Weiss family, and draws on a tradition of more than 140 years. Our home is in Germany, our customers are all over the world. Today, more than 45% of our employees work outside Germany, strengthening our presence directly on our customers' markets. Always developing further, and with an international reach, our human resources management guarantees uniform SMS quality standards in recruitment, qualification, and on-the-job training of our employees.

Our corporate family, consisting of Business Areas SMS Siemag with Paul Wurth, SMS Meer, and elexis AG and with employees from over 40 nations, relies on a culture of responsibility, communication, team spirit, and flat hierarchies. That goes for the whole world, whether in Europe, China, India, North and South America, or Russia.

As a high-tech company that occupies the leading position on many of our markets, we depend on gaining the best talent everywhere. We can only defend our market position if we stay innovative. That's why we have to be an attractive employer.

The first part of our strategy is bringing qualified youngsters on board. Secondly, we train young specialists in-house. Our apprenticeship quota in Germany is some 6%.

But that's not all. We also want current employees with their valuable experience to stay with us. Proof that we are successful in this is provided by the average time of more than 17 years our employees stay with the company (Siemag and Meer). We do a great deal to ensure this. That includes a strong focus on on-the-job training. Furthermore, we create good career prospects and encourage exchanges of apprentices, specialist employees, and managers. This is how we promote know-how transfer between our locations around the globe.

Set up in 2013, the SMS expert net is an internal social media platform for all employees worldwide. It links up the expertise within our group globally. More than 5,000 employees have already registered with their own profiles and now benefit from this new communication channel for worldwide sharing of experience and know-how.

The number of employees in the SMS group in 2013 was 13,871, only slightly more than in 2012 (13,588). Of these, 1,660 were employed by Paul Wurth. The employee figure at elexis AG was 1,023. Business Area SMS Siemag numbered 7,487 employees in the past business year (2012: 7,515). There were 3,643 employees in Business Area SMS Meer (2012: 3,496).

PERSONNEL DEVELOPMENT WORLDWIDE

We understand that personnel development is a key factor in motivating employees and binding them to the company in the long term. That's why we engage once a year with every employee to carry out a structured performance analysis. Together, we agree on personal development goals.

Also an established scheme that promotes excellence, our talent management involves regular meetings of superiors who discuss the development potential of especially talented employees. It identifies people with potential and gives them the scope to get ahead.

We rely among other things on a 360°-feedback system to show superiors how their management skills shape up

Management staff benefit from measures tailored to all career paths and levels to support them in their jobs. There is a focus here on establishing a common management culture worldwide, with effective training for project managers, and on constantly improving our organization by developing teams and company units.

Looking beyond Germany, we regularly harmonize our human resources management and development with those of our foreign companies to create international standards so that our employees find the same values and goals everywhere within the group.

CERTIFIED ENVIRONMENT PROTECTION AND WORK SAFETY

In March 2014, SMS Siemag AG achieved ISO 14001:2004 and OHSAS 18001:2007 certification of its environment-protection and work-safety management system.

Proof of our commitment in these areas, the system continuously improves work safety and environmental protection as well as meeting our customers' ever-higher standards for suppliers.

FOCUS ON NEW TALENT

We have been working steadily for years to make the SMS group even better known and more attractive as an employer.

It is important to enthuse youngsters for technology as early as possible – at kindergarten, school, and university. Here we utilize not only direct contacts during cooperation schemes and projects such as "Kids discover technology", "Dialog with youth", or "University meets practice", but also make the most of social media.

That includes for instance spreading information via InternetTV and YouTube about our many fields of business, training opportunities, and career openings.

We make contact with potential candidates for an apprenticeship, study support program, or direct recruitment at an early date. Our introduction programs in the relevant specialist departments help new colleagues understand their work and key processes.

Once again last year, school students gained insights into the world of work at the companies in the SMS group during internships and tours of the company.

ON-THE-JOB TRAINING

The success of our company builds on the competence, commitment, and innovative energy of our employees.

That's why the companies in the SMS group continuously promote life-long learning through on-the-job training geared to employees' needs and the requirements in metallurgical plant and machinery construction.

The ongoing development of our machines and plants in terms of technology and processes makes constant further qualification of our staff crucial. Against this background, we draw up and implement tailor-made programs, both for individual employees and for whole departments, supporting them in realizing strategic policies.

SMS ACADEMY

There was even more interest in 2013 in our SMS Academy, which was founded in 2005. A total of 3,108 employees attended Academy events in their free time.

Included here are not only work-related qualification programs, but also a broad range of additional opportunities for employees to enhance their knowledge and find out about topics outside their own specialties. The Academy fires the enthusiasm of our employees for technology and technological ideas as well as intercultural competence, and helps them optimize their personal working methods. This contributes to a culture of life-long learning.



Pooling of online learning offers

A special component of the Academy program is our "webucation" range of topics. The term covers all online learning resources. Employees can choose from classic e-learning, web-based-training, audio books, telephone training, and video learning.

NEW IDEAS FROM SUCCESSFUL IMPULSE SCHEME

As a result of our IMPULSE ideas management scheme (Siemag and Meer), savings of EUR 1.48 million were identified in 2013. This was a result of 1,940 suggestions from our employees, who were rewarded with prize money totaling EUR 428,000.

WORK-LIFE BALANCE

We support our employees in finding a good work-life balance. Our child care centers offer professional care, including daycare for children below the age of three. New in the mix are the parent-child offices we set up last year. They help our employees bridge short-term care gaps.

Other benefits for our staff range from company pensions through company loans to flexible hours, lifetime working accounts, and sabbaticals.

All this has earned us the "Beruf und Familie" (Work and Family) certificate from the German Federal Ministry for the Family, which we have held since 2012.

To promote health, we also support a broad range of staff sports groups.

CONSOLIDATED FINANCIAL STATEMENTS AS OF DECEMBER 31, 2013

BALANCE SHEET
(IN THOUSANDS OF EUR)

ASSETS	Dec. 31, 2013	Dec. 31, 2012
Intangible assets	499,135	588,261
Property, plant, and equipment	666,855	609,767
Investments in companies accounted by equity method	62,752	61,965
Investments in unconsolidated, affiliated companies	30,885	33,494
Other equity investments	1,337	3,213
Investment securities	68,147	48,384
Deferred tax assets	71,047	144,613
Other non-current assets	11,405	13,321
Non-current assets	**1,411,563**	**1,503,018**
Inventories	938,843	968,579
Trade receivables	814,247	868,662
Receivables from income taxes	50,632	45,427
Other current assets	137,314	157,062
Securities	798,251	850,211
Cash and cash equivalents	1,157,787	1,278,991
Current assets	**3,897,074**	**4,168,932**
Total assets	**5,308,637**	**5,671,950**

LIABILITIES	Dec. 31, 2013	Dec. 31, 2012
Shareholders' equity	**1,022,500**	**1,079,993**
Noncurrent financial liabilities	25,154	13,143
Provisions for pensions and similar obligations	675,034	636,766
Deferred tax liabilities	283,214	355,225
Other non-current provisions	30,162	36,835
Other non-current liabilities	3,450	407
Non-current liabilities and provisions	**1,017,014**	**1,042,376**
Current financial liabilities	170,911	136,122
Trade payables	369,903	411,946
Liabilities from income taxes	84,391	79,986
Advance payments received	1,058,816	1,211,247
Other current provisions	1,338,393	1,429,479
Other current liabilities	246,709	280,801
Current liabilities and provisions	**3,269,123**	**3,549,581**
Total liabilities	**5,308,637**	**5,671,950**

INCOME STATEMENT
(IN THOUSANDS OF EUR)

	2013	2012
Revenue	3,495,278	3,237,394
Cost of sales	-2,693,778	-2,418,723
Gross profit	**801,500**	**818,671**
Selling expenses	-318,146	-286,915
General administrative expenses	-155,617	-130,740
Other operating income	11,853	21,172
Other operating expenses	-192,151	-180,467
Result from investments accounted by equity method	2,644	0
Net investment income	-646	-1,315
Net interest income	29,006	17,788
Pre-tax profit	**178,443**	**258,194**
Income taxes	-52,393	-100,572
Net profit for the year	**126,050**	**157,622**

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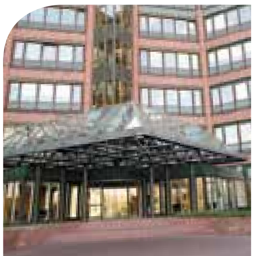
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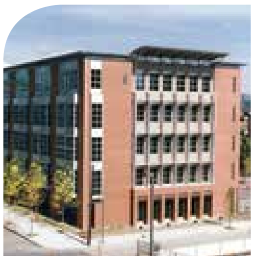
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